S T A T E O F M I C H I G A N

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

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In the matter of the application of DTE ELECTRIC COMPANY for approval of Certificates of Necessity pursuant to MCL 460.6s, as amended, in connection with the addition of a natural gas combined cycle generating facility to its generation fleet and for related accounting and ratemaking authorizations.	**)**	**Case No. U-18419**

QUALIFICATIONS AND DIRECT TESTIMONY OF

PAUL A. PROUDFOOT

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

QUALIFICATIONS OF PAUL PROUDFOOT
CASE NUMBER U-18419
PART I

Q. Would you please state your name and business address for the record?

A. My name is Paul A. Proudfoot. My business address is 7109 West Saginaw Hwy, Lansing, Michigan.

Q. By whom are you employed and what is your position?

A. I am employed by the Michigan Public Service Commission as Director of the Electric Reliability Division. The primary responsibility of the Electric Reliability Division is implementation of Michigan 2016 Public Act 342 which require electric and gas providers to meet renewable energy and energy waste reduction standards and goals contained within the Act. The division is also responsible for electric reliability and planning issues, Certificate of Need applications pursuant to Michigan 2016 Public Act 341, and the Certificate of Public Convenience and Necessity applications for transmission projects pursuant to Michigan 1995 Public Act 30.

Q. Would you please state your educational background?

A. I hold a Bachelor of Science Degree from the Michigan State University School of Packaging, which is within the College of Agriculture. As a student in the School of Packaging, I studied the technical areas required to design and manufacture packaging systems including material characteristics, physical design, and material testing. The management tract in which I was enrolled also included general business curriculum courses in accounting, economics, and marketing. I was interested in data processing and took my electives in that area.

During my senior year, I worked for the School of Packaging as a Programming Consultant and Lab Instructor.

Q. Would you please state your professional experience?

A. After graduation, I started at the MPSC as a Data Systems Analyst with the Utility Systems Audit Section. The function of the Utility Systems Audit Section was to provide the Commission Staff (Staff) with assistance and expertise in the areas of data processing, statistical analysis, and special studies. During the four-year period, I concentrated my efforts in the area of computerized statistical analysis. To assist in that, I attended seminars and short courses on the subject.

Then, I transferred to the Operations Development Division. The Operations Development Division's primary purpose was to provide technical research and planning capabilities within the Commission Staff. I held the position of Quantitative Methods Specialist within the Operational Support Section. My job function was to assist and direct the Staff in the application of quantitative problem-solving techniques requiring utilization of computer resources. I also performed or directed various special studies and projects, which required my quantitative analytical expertise.

In 1985, I went to work for the Communication Division of the MPSC in the Engineering and Tariff Section where my duties included the review of tariff filing including testifying in support of the Staff's position, quality of service

analysis, and provision of support to management and other Staff in the review of utility filings.

In June of 1986 I was given a special assignment in the Michigan Electricity Operations Study (MEOS). MEOS was a joint public/private sector project, created by Governor Blanchard, to plan for the electric needs of the State of Michigan into the twenty-first century. I reported to the project manager and served as technical consultant to the project in the computer utilization and computer modeling areas.

The project was completed in September of 1987, and I returned to the Commission as Supervisor of the Forecasting Section within the Strategic Planning Division. In this position, I was responsible for supervising the forecasting activity within the MPSC.

In February of 1989 I assumed a position as Supervisor of the Planning Section where I was responsible for review of electric utility planning efforts. This function included the development of an integrated resource planning process.

In May of 1996, I was appointed to the position of Supervisor of the Gas Safety Section. In this position, I completed the pipeline inspector courses offered by the Transportation Safety Institute.

In 2003, the responsibilities of the gas and electric were merged within the Commission. I was assigned additional areas of responsibility including electric safety and electric reliability, emergency and outage event reporting, and advising the Commission on actions to be taken in such an event. Serving in this function I was the lead investigator regarding technical issues surrounding the August 14, 2003 blackout and a chief author of the Commission's report. During this period, I also assisted in the management of the Capacity Need Forum (CNF) which including managing the capacity expansion modeling portion of the project. The CNF was an industry-wide collaborative process created by Commission order to assess the projected need for electrical generating capacity in Michigan.

From 2007 to 2008 I was Supervisor of the Electric Operations Section within the Operations and Wholesale Markets Division. In this position I was responsible for electric reliability issues, electric energy planning, electric distribution performance, pole attachment issues, Rule 411 disputes, electric metering issues, and electric engineering support regarding wholesale market issues. During this period, I also assisted in the management of the 21 Century Energy Plan as a key adviser and chairman of the workgroup. The workgroup was responsible for managing the capacity expansion modeling and reviewing proposed changes to the structure of the electric industry in Michigan. The 21 Century Energy Plan project was created by executive directive No. 2006-2. It called for the development of a comprehensive plan for meeting the State's electric power

needs and asked for recommendations to ensure the State maintained both reliability and capacity to meet its growing electric needs while keeping electric costs competitive.

I served as Director of the Operations and Wholesale Markets Division from 2008 to 2009. The Operations and Wholesale Markets Division is responsible for electric reliability issues, electric energy planning, electric distribution performance, pole attachment issues, Rule 411 disputes, electric metering issues, wholesale market issues, natural gas pipeline safety, natural gas production issues and natural gas pipeline and electric transmission certification issues. I assumed the responsibilities as the Director of Electric Reliability Division at the end of 2008 and served in both capacities until early 2009.

Q. Have you previously testified before this Commission?

A. Yes, I have testified before this Commission on a number of occasions: U-5141 was an application by Michigan Consolidated Gas Company for permission to implement an energy conservation program, U-5510 was a similar case involving the Consumers Power Company, U-6633 was the initial cost recovering hearing for Detroit Edison's RCS Program, U-7660 was a Detroit Edison rate case in which I testified as to the amount of revenue deferral for Fermi II, and U-8128 where I testified as to private line tariffs for Michigan Bell. I have also testified in several cases involving the settlement of pole attachment issues. I have testified in the following cases relative to IRP and planning: U-9346 was a

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Consumers Power general rate case, U-9507 was an application by Consumers Power to seek approval for the Palisades Generating Company contract, U-9586 was the Consumers Power bidding framework case, U-9798 was the Detroit Edison bidding framework case, U-10059/U-10061 was a case regarding the need for a new transmission line, U-10143/U-10176 was the retail wheeling case, U-10335 was a Consumers Power general rate case, U-10102 was a Detroit Edison general rate case, U-10554 a Consumers Power DSM reconciliation, U-10671 a Detroit Edison DSM reconciliation, U-10710 a Consumers Power PSCR, U-10685 a Consumers Power generate rate hearing, and U-10840 a Detroit Edison capacity planning case. While working in the gas safety area I testified in support of rulemaking activities regarding the Michigan Gas Safety Standards most notably case U-11750 which implemented additional standards for natural gas pipeline operations transporting natural gas with high levels of Hydrogen Sulfide. As Director of the Electric Reliability Division I testified in U-16200, International Transmission Company's application in request for an expedited siting certificate for the construction of the Thumb Loop.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present Staff's position in the matter of DTE Electric Company's (DTE or Company) application for Certificates of Necessity pursuant to 2016 Public Act 341 for the construction of a natural gas combined cycle generating facility.

Q. What specific guidance was available to Staff in its review of DTE's application?

A. Staff relied upon Public Act 341 of 2016, specifically MCL 460.6s and Filing Requirements and Instructions for Certificate of Public Convenience and Necessity Application Instructions found in the Commission's May 11, 2017 order in Case No. U-15896 and the Integrated Resource Planning Filing Guidelines found in the Commissions December 23, 2008 Order in Case No. U-15896. These orders were adopted for the purposes of implementing MCL 460.6s (10) and (11).

Q. What specific elements of DTE's application will be covered by your testimony?

A. My testimony will cover filing provisions outlined in MCL 460.6s, subsection (3) (a), (b), and (d), subsection (4) (a), (b), (c), (d) and (e) as covered by the various Staff in this proceeding. I will also address MCL 460.6s, subsection (7).

Q. Are you sponsoring any Exhibits?

A. No.

Q. What specific certificates of necessity (CON) is the Company requesting in its application to the Commission?

A. As reflected in its application on pages 10 and 11, DTE has requested the following three (3) certificates of necessity from the Commission;

1. A CON that the power to be supplied as a result of the proposed construction, investment or purchase is needed;

2. A CON that the design characteristics of the proposed electric generation facility or investment in an existing electric generation facility or the terms of a power purchase agreement represent the most reasonable and prudent means of meeting future power needs;

3. A CON that the estimated capital or purchase costs of the new or existing electric generation facility or the investment in an existing electric generation facility will be recoverable in rates from the electric utility's customers.

MCL 460.6s (4) (a)

Q. Has DTE demonstrated a need for the power that would be supplied from the proposed natural gas combined cycle generation facility (proposed project) through an Integrated Resource Plan (IRP) that complies with MCL 460.6s, subsection (11)?

A. The Company has demonstrated through its IRP that the power is needed. However, Staff witnesses have provided direct testimony detailing issues with the IRP filed by DTE. Staff testimony identifies supply and demand resources that were over looked or underutilized by DTE in its IRP analysis. If the supply and demand resources identified by Staff are combined, it generates resource options that could be used to partially replace DTE's proposed plant.

Q. Do you concur with the analysis and findings outlined in testimony by Staff witnesses Naomi J. Simpson, Olumide O. Makinde, Karen M. Gould, Katie J. Smith, and Jesse J. Harlow?

A. Yes. The various Staff witnesses have identified specific defects in the DTE IRP analysis. If the additional resource options and modeling considerations identified by Staff were considered in the Company's IRP analysis, the analysis may have generated a different result.

Q Did the Staff run an IRP analysis which combined its issues into a cohesive analysis of the DTE proposal?

A No. Time and resource limitations prevented the Staff from analyzing the positions outlined in Staff testimony into a single analytical position.

Q. Did Staff make a request to the Company to run a single model run to provide Staff with a cohesive analysis of Staff's position?

A. Yes. Staff's request is identified in Exhibit S-2.10 as discussed by witness Simpson.

Q Taking Staff's findings into consideration, do you recommend that the Commission grant DTE a "certificate of necessity that the power to be supplied as a result of the proposed construction, investment or purchase is needed" as indicated in MCL 460.6s (3) (a)?

A Yes, I am recommending that the Commission grant the certificate that the power supplied is needed. Although Staff has pointed out deficiencies in the analysis used by DTE to support its request, the Company did not have specific IRP

guidance provided by the Commission that is now available.[1] However, if after reviewing DTE's presentation and taking into consideration Staff's analysis of that presentation the Commission could certainly choose to deny DTE's request for the "certificate of necessity that the power to be supplied as a result of the proposed construction, investment or purchase is needed". Staff has pointed out ample reasons for such a rejection.

MCL 460.6s (4) (b)

Q. Based upon the information supplied by the Company, will the proposed project comply with all applicable state and federal environmental standards, laws, and rules?

A. Yes. As stated by Company witness Marietta[2], and as confirmed through Staff discovery discussed in witness Simpson's testimony[3], it is reasonable to expect that the Proposed Project will comply with all applicable state and federal environmental standards, laws, and rules.

MCL 460.6s (4) (c)

Q. What costs for the proposed project does Staff recommend the Commission approve for recovery through future rates?

A. An adjustment to the Company's Proposed Project cost is discussed by witness Simpson.[4] Taking into account witness Simpson's adjustment, Staff recommends

[1] MPSC Case No. U-18418, 11/21/2017 Order.
[2] Prefiled Direct Testimony and Exhibits of Barry J. Marietta, pp 11-12.
[3] Testimony and Exhibits of Naomi J. Simpson, pp 8-11.
[4] Testimony and Exhibits of Naomi J. Simpson, pp 15-18.

the Commission approve the Company for $951.8 million to construct the proposed project.

Q. Are you recommending the Commission grant DTE's request for a "certificate of necessity that the estimated capital or purchase costs of the new or existing electric generation facility or the investment in an existing electric generation facility will be recoverable in rates from the electric utility's customers" as identified in MCL 460.6s (3) (d)?

A. Yes. DTE has demonstrated to Staff that it is using a competitive bid strategy to contract its Proposed Project. The Company demonstrated its strategy through a mutually agreed upon meeting to review bids the Company received as responses to request for proposals (RFPs) for both power island equipment (PIE) and full wrap engineer, procure, construct (EPC) services. The meeting was the result of the Administrative Law Judge's (ALJ) ruling on DTE's motion to limit discovery and was held on Monday, December 18, 2017.[5]

Q. Does Staff have concerns about the Company's competitive bid process?

A. Yes. Staff does maintain concerns about the Company's competitive bid process regarding power purchase agreements (PPAs). The Company imposed limits in its RFP for PPAs that may have unfairly excluded some respondents. Staff's concerns are discussed further by witness Simpson.[6]

MCL 460.6s (4) (d)

[5] 4 TR 149.
[6] Testimony and Exhibits of Naomi J. Simpson, pp 12-13.

Q. Is the Proposed Project the most reasonable and prudent means of meeting DTE's energy and capacity need relative to other resource options for meeting demand, including energy efficiency, electric transmission efficiencies, and any alternative proposals submitted under this section by existing suppliers of electric generation capacity under subsection (13) or other intervenors?

A. Again, as discussed in Staff testimony, there are defects in the DTE analysis that have been identified. DTE has not met the IRP standard developed under the process required by 2016 PA 341 and adopted by the Commission's recent order.[7] However, this guidance was not available to DTE at the time of its filing; therefore, Staff recommends that in all future IRP and CON filings that DTE be required to more adequately address the issues noted by Staff.

Q. In considering DTE's request for a "certificate of necessity that the design characteristics of the proposed electric generation facility or investment in an existing electric generation facility or the terms of a power purchase agreement represent the most reasonable and prudent means of meeting future power needs" as indicated in MCL 460.6s (3) (b), what is your recommendation to the Commission?

A DTE has met the minimum level of IRP standards required for approval at this time, and Staff recommends the Commission grant DTE's request for approval of the "Certificate of Necessity that the design characteristics of the proposed electric generation facility or investment in an existing electric generation facility

[7] MPSC Case No. U-18418, 11/21/2017 Order

or the terms of a power purchase agreement represent the most reasonable and prudent means of meeting future power needs". Although, given the many deficiencies in the DTE presentation identified by Staff, the Commission does have basis for denial of the Company's requested certificate. Given the guidance provided in the Commission's order in Case No. U-18418, the Commission could require the Company to perform a more robust analysis and presentation before granting the request.

MCL 460.6s (4) (e)

Q. Will the Company's Proposed Project be completed using a workforce composed of residents of Michigan?

A. Yes, as stated in Company witness Dan O. Fahrer's testimony, "[t]he Company estimates more than 90% of the craft labor will be comprised of Michigan residents."[8] Witness Fahrer also specifically identified eighteen (18) labor unions.[9]

MCL 460.6s (7)

Q. How does the Company propose to satisfy the requirement set forth in MCL 460.6s, subsection (7) regarding filing of annual reports to the Commission on the status of the project for which Certificates of Necessity are granted under MCL 460.6s, subsection (4), including an update concerning the cost and schedule of the project?

[8] Prefiled Direct Testimony and Exhibits of Dan O. Fahrer, p 14.
[9] *Id.*, at pp 14-15.

A. Company witness Dan O. Fahrer's testimony identifies the project schedule and related costs for the project.[10] Through a response to Staff discovery, DTE has indicated its intent to file a narrative report to the Commission on an annual basis. However, due to the scale and capital investment of the Proposed Project, Staff has recommended biannual review filings as discussed in witness Simpson's testimony with additional communication to Staff if significant impacts to cost or timing occur.[11]

Q. Does this conclude your testimony?

A. Yes, it does.

[10] Prefiled Direct Testimony and Exhibits of Dan O. Fahrer, pp 7 and Exhibits A-42, A-43, and A-44.
[11]Testimony and Exhibits of Naomi J. Simpson, pp 18-19.

S T A T E OF M I C H I G A N

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

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In the matter of the application of	**)**	
DTE ELECTRIC COMPANY	**)**	
approval of Certificates of Necessity	**)**	**Case No. U-18419**
pursuant to MCL 460.6s, as amended,	**)**	
in connection with the addition of a	**)**	
natural gas combined cycle generating	**)**	
facility to its generation fleet and for	**)**	
related accounting and ratemaking	**)**	
authorizations.	**)**	

QUALIFICATIONS AND DIRECT TESTIMONY OF

NAOMI J. SIMPSON

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

QUALIFICATIONS OF NAOMI J. SIMPSON
CASE NUMBER U-18419
PART I

Q. Please state your full name and business address for the record.

A. My name is Naomi J. Simpson. My business address is the Michigan Public Service Commission's (Commission) work site at 7109 West Saginaw Highway, Lansing, Michigan 48917.

Q. By whom are you employed and in what capacity?

A. I am employed in the Electric Reliability Division of the Michigan Public Service Commission. I am a Public Utilities Engineer in the Generation and Certificate of Need Section, which is responsible for assisting in the implementation of Public Act 341 of 2016 and evaluating applications for transmission siting pursuant to Public Act 30 of 1995.

Q. Would you please outline your educational background?

A. Yes. I earned a Bachelor of Science degree in Engineering from Michigan State University in 1997 and a Master of Arts degree in Education from the University of Phoenix in 2010. Since joining the Commission, I have also attended several training programs sponsored by the National Association of Regulatory Utility Commissioners and Michigan State University, including the Annual Regulatory Studies Program (August 2011, 2012, 2013), the Advanced Regulatory Studies Program (October 2011, 2012, 2013, 2014), and Introduction to Public Utility Regulation and Ratemaking (May 2012). In addition, I have attended the Distribution Efficiency Planning and Voltage Optimization conference sponsored by Electric Utility Consultants, Inc. (June 2012), the annual Energy, Utility & Environment Conference (January 2013), the National Energy Risk Lab (February 2014), multiple EGEAS modeling training sessions at various Midcontinent

Independent System Operator (MISO) locations (2015, 2016) and the Peak Load Management Alliance (2016).

Q. Would you please outline your professional experience?

A. In September 1994, I began working at General Motors Corporation as a student engineer, where I worked with staff engineers to evaluate vehicle calibrations and components related to meeting vehicle emissions standards and fuel efficiency.

In February 1998, I began working as a staff Design and Release Engineer with responsibility for vehicle platform exhaust systems in Delphi Automotive Systems, a subsidiary of General Motors, which later became a fully independent corporation in 1999. My duties as a Design and Release Engineer included design team management, durability test validation, production approval, and lean manufacturing implementation. In August 2000, I became the Engineering Change Management Coordinator for Delphi Lansing Cockpit Assembly Plant, where I was responsible for model year program management, mid-cycle engineering change management, and designated engineering liaison to General Motors staff product engineers, manufacturing engineers and quality engineers associated with cockpit production. In 2002, I became the on-site Systems, Applications & Products in Data Processing project manager for the Delphi Lansing Cockpit Assembly Plant in addition to my previous responsibilities. In November 2004, I was assigned the duties of Quality Manager with responsibility for plant-wide first-time quality goals, root cause analysis, supplier quality standards, and statistical defect analysis.

In 2007, I accepted a position at Barnard Manufacturing, Inc. as a commodity buyer of steel and aluminum raw material. My responsibilities included negotiation of commodity contracts to create the most efficient pricing structure while ensuring timely delivery, creating material quality specifications, initiating build schedules based on customer-desired completion dates, and maintaining a material pricing database for all manufactured components.

In March of 2011, I accepted a position as a Public Utilities Engineer in the Smart Grid Section of the Michigan Public Service Commission. I was a member of the Smart Grid Collaborative as the co-chair of the Customer Programs and Communication workgroup. I supported Staff witnesses with the analysis of Consumers Energy Company's Advanced Metering Infrastructure / Smart Grid proposal and request for recovery in Case No. U-16794. I assisted with writing the Staff report to the Commission in Case No. U-17000. Upon transfer to the Generation and Certificate of Need Section in May of 2012, I began testifying as an expert witness in utility generation certificate of necessity application filings and utility transmission certificate of public convenience and necessity application filings. In 2015, the Commission established a Demand Response Programs Work Group. I am a founding member of that group, which has concluded.

Q. Have you previously presented testimony before the Commission?

A. Yes. I prepared and filed testimony for the following cases:

QUALIFICATIONS OF NAOMI J. SIMPSON
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1. Case No. U-16801, Indiana Michigan Power Company electric rate case.

2. Case No. U-17041, Michigan Electric Transmission Company, LLC application for a certificate of public convenience and necessity for the construction of a transmission line.

3. Case No. U-17272, ATC Management Inc. and American Transmission Co., LLC application for a certificate of public convenience and necessity for the construction of a transmission line.

4. Case No. U-17429, Consumers Energy Company application for a certificate of necessity for the Thetford Generating Plant.

5. Case No. U-17767, DTE Electric Company electric rate case.

6. Case No. U-18014, DTE Electric Company electric rate case.

7. Case No. U-18224, Upper Michigan Energy Resources Corporation application for a certificate of necessity for two reciprocating internal combustion engine electric generation facilities.

8. Case No. U-18322, Consumers Energy Company electric rate case.

9. Case No. U-18255, DTE Electric Company electric rate case.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present the Michigan Public Service Commission Staff's (Staff) position in the matter of DTE Electric Company's (DTE or Company) application for certificates of necessity pursuant to 2016 Public Act 341 (Act 341), MCL 460.6s for DTE's proposed addition of a natural gas combined cycle generating facility to its generation fleet located at the Company's Belle River Power Plant site.

Q. What specific guidance was available to Staff in its review of DTE's proposed natural gas combined cycle generation facility (proposed project)?

A. Staff relied upon Act 341, specifically MCL 460.6s and the Commission's May 11, 2017 Order in Case No. U-15896 Filing Requirements and Instructions for Certificate of Public Convenience and Necessity Application Instructions (Filing Requirements), adopted for the purposes of implementing MCL 460.6s (10) and (11).

Q. What specific elements of DTE's application will be covered by your testimony?

A. My testimony will cover the application filing requirements outlined in MCL 460.6s (11) subsections (a), (b), (e), (f), and (g), MCL 460.6s(4)(b), MCL 460.6s(6), MCL 460.6s(7), and MCL 460.6s(9).

Q. Are you sponsoring any exhibits?

A. Yes, I am sponsoring the following exhibits:

Exhibit No.	**Description**
Exhibit S-1.1	Make and Model of Advanced Class NGCC
Exhibit S-1.2	Environmental Permit Matrix

Exhibit S-1.3	Environmental Permit Descriptions
Exhibit S-1.4	Competitive Bid Process
Exhibit S-1.5	Transmission Cost Reimbursement
Exhibit S-1.6	Estimated Transmission Costs
Exhibit S-1.7	Estimated Contingency Costs
Exhibit S-1.8	Risk Register
Exhibit S-1.9	Annual Reporting
Exhibit S-1.10	Alternative Scenario
Exhibit S-1.11	DTE response related to Midland Cogeneration Venture

Q. Is the Company seeking multiple certificates of necessity in its application?

A. Yes. The Company is seeking three certificates applicable to the Exhibit A requirements and instructions as identified in the Commission order issued on May 11, 2017 in Case No. U-15896. Pursuant to Act 341, Section 6s (3), the Company is seeking the following certificates of necessity (CON):[1]

1. A certificate of necessity that the power to be supplied as a result of the proposed construction, investment, or purchase is needed;

2. A certificate of necessity that the size, fuel type, and other design characteristics of the existing or proposed electric generation facility or the terms of the power purchase agreement represent the most reasonable and prudent means of meeting that power need;

[1] Prefiled Direct Testimony and Exhibits of Irene M. Dimitry, pp 10-11.

3. A certificate of necessity that the estimated capital costs of and the financing plan for the proposed electric generation facility, including, but not limited to, the costs of siting and licensing a new facility and the estimated cost of power from the proposed electric generation facility, will be recoverable in rates from the electric utility's customers.

Q. Please provide a description of DTE's proposed project.

A. The Company has described the proposed project to be "configured as a nominal 1,100 MW, multi-shaft 2x1 combustion turbine combined cycle power plant burning natural gas fuel only."[2] Company witness William H. Damon III testifies that the proposed project expects to use an advanced class natural gas combustion turbine technology that is the most efficient power generation technology in the market today.[3] Witness Damon goes on to describe the proposed project as being configured with two combustion turbine generators, heat recovery steam generators equipped with duct burners, and the best available control technology for air emissions that includes selective catalytic reduction and oxidation catalysts.

Q. Has the Company provided specific details about the advanced combustion turbine combined cycle technology it intends to use, including make and model of the proposed project?

A. No. The Company declined to answer Staff's discovery asking for additional information including the make, model, and examples of the same advanced class

[2] Prefiled Direct Testimony and Exhibits of William H. Damon III, p 14.
[3] *Id.*

technology the Company is proposing for this project, stating that negotiations are still ongoing.[4] Company witness Damon did provide a couple of potentially similar examples of advanced combustion turbine technology that have just begun commercial operation in 2017. No other information about the advanced class technology has been provided.

Q. Does the Company provide a description of the water, gas and transmission infrastructure needed for operation of the proposed project?

A. Witness Damon describes the Proposed Project's water, gas and transmission infrastructure. The proposed project will include water treatment facilities, a warehouse, an auxiliary boiler, feedwater pumps, administrative buildings, a natural gas fuel system, gas heating and filtering sub-systems, wet mechanical cooling towers and closed loop cooling water heat exchangers.[5] It will connect to the electric transmission system at 345 kV transmission lines adjacent the proposed project site. Natural gas will be supplied by a new pipeline extension from the main gas transmission line located along Puttygut Road.[6]

MCL 460.6s(4)(b)

Q. How does the filing requirement in Section VII, Part A, subpart 8 address construction and operation permitting.[7]

[4] Exhibit S-1.1
[5] Prefiled Direct Testimony and Exhibits of William H Damon III, p 15.
[6] *Id.*
[7] Filing requirements in Case No. U-15896, May 11, 2017 order.

A. The filing requirement in Section VII, Part A, subpart 8 requires that an application seeking to construct a new electric generation facility include, "[a] description of all major state, federal, and local permits required to construct and operate the proposed generation facility or the proposed facility upgrades in compliance with state and federal environmental standards, laws, and rules."

Q. What information has the Company supplied in effort to comply with the Filing Requirements as stated in Section VII, Part A, subpart 8?

A. Company witness Damon has provided a general permit list.[8] In addition, as a response to Staff's discovery, the Company provided a description of each of the permits listed in Mr. Damon's testimony and an all-inclusive permitting matrix.[9] The matrix provides detailed information identifying which permits are applicable to the proposed project and the responsible stakeholder for the acquisition of each permit.

Q. How does the filing requirement in Section VII, Part A, subpart 12 address water and sewer infrastructure required for construction and operation of the Proposed Project?[10]

A. The filing requirement in Section VII, Part A, subpart 12 requires an application seeking a certificate of necessity to construct a new electric generation facility that includes, "[i]f applicable, water and sewer infrastructure required for

[8] Prefiled Direct Testimony and Exhibits of William H. Damon III, pp 13-14.
[9] Exhibit S-1.2 and Exhibit S-1.3
[10] Filing requirements in Case No. U-15896.*In re, on the Commission's own motion, to implement the provisions of MCL 460.6s(10) and (11),* 5/11/2017 Order, MPSC Case No. U-15896, Attachment A, Filing Requirements and Instructions for Certificate of Public Convenience and Necessity Application Instructions. .

construction and operation not located on the proposed site but required for plant construction and operation."

Q. What information has the Company supplied in effort to comply with the filing requirements as stated in Section VII, Part A, subpart 12?

A. The Company has not identified the need for any new infrastructure outside the project site boundary.[11] The Company plans to draw water supply from the existing river water intake structure at the St. Clair River. The estimated usage of water is within the water rights the Company has associated with the Belle River Power Plant.[12] Any waste water discharged from the proposed project would be delivered to the Belle River seal well and discharged into the St. Clair River.[13]

Q. Does the information supplied in the Company's application indicate that the proposed electric generation facility will comply with all applicable state and federal environmental standards, laws, and rules?

A. Yes, based upon the information provided in the Company's pre-filed direct testimony and in response to Staff's discovery, the Company has indicated that the proposed project will comply with all applicable state and federal environmental standards, laws and rules.

Q. Does Staff have any recommendations regarding environmental or construction permits for this project?

A. Yes, Staff recommends that the Company submit a list of all final environmental and/or construction permits that are obtained for the construction and operation of

[11] Prefiled Direct Testimony and Exhibits of William H. Damon III, p 19.
[12] *Id.*, at, p 11.
[13] *Id.*, at, p 18.

the proposed project accompanied by an affidavit stating that all necessary permits have been acquired.

MCL 460.6s(6) and 6s(9)

Q. What steps has DTE taken to ensure that the proposed project costs are reasonable?

A. The Company has initiated a competitive bid process that is currently in progress and is seeking bids for both a Balance of Plant (BOP) Engineer, Procurement, and Construction (EPC) contracting strategy and a full wrap EPC strategy.[14] The Company provided additional detail about the competitive bid process in response to Staff's discovery.[15] The Company also reviewed the bids with Staff in a confidential meeting held on December 18, 2017 as directed by the ALJ in this case. (4TR 149-151).

Q. Did the Company investigate other resource options such as plant acquisitions or power purchase agreements?

A. Yes. The Company solicited bids for both existing plant acquisitions and power purchase agreements. According to the Company, "[t]he RFP issued on March 1, 2017 served two purposes: to identify alternative resources to address the ~ 1,100 MW of capacity need as determined via the IRP analysis and also to identify resources that could potentially address short-term capacity needs."[16] Three bids were received from two suppliers. One bid was for the acquisition of an 1,100 MW plant. The Company's analysis indicated a significant net present value

[14] Prefiled Direct Testimony and Exhibits of Dan O Fahrer, p 7.
[15] Exhibit S-1.4
[16] Prefiled Direct Testimony and Exhibits of Irene M. Dimitry, pp 30-31.

revenue requirement benefit to the proposed project as compared to the acquisition of the existing facility.[17] Due to their size, 70 MW and 225 MW, the other two bids were not considered to be alternatives to the Company's proposed project.

Q. Did the Company receive any other responses to its Request for Proposal (RFP)?

A. Yes. The Company indicated, in response to Staff's discovery, that Midland Cogeneration Venture (MCV) provided a letter to the Company indicating that the 7-year PPA term restriction was unfairly restrictive and prohibited MCV from submitting a bid.[18]

Q. Does Staff have any comments related to the 7-year restriction on PPA bids imposed by the Company?

A. Yes. Staff understands both the Company's concerns with the risk of long-term PPAs and MCV's concerns with the short-term PPA limitation that creates a limiting timeframe to recover investment. Although long-term PPA's can present risks to the Company, ratepayers, and in this case MCV, Staff believes that those risks could be addressed through a well-written contract. The limited term requirement imposed by the Company restricted PPA bids unnecessarily. The Company is proposing to construct an 1,100 MW baseload generating facility that would likely have a useful operating life of at least 30 years. Ratepayers are taking on significant financial risk with the Company's proposal and the Company should fully consider all available options to serve its electric load.

[17] Prefiled Direct Testimony and Exhibits of Irene M. Dimitry, p 30 and Exhibit A-2.
[18] Exhibit S-1.11.

However, it is important to point out that MCV could have submitted an alternative proposal to the Commission as indicated in MCL 460.6s, subsection 13.

Q. Did the Company indicate that it may update its costs in its filing?

A. Yes. Company witnesses Irene M. Dimitry, Kevin J. Chreston and Dan O. Fahrer have all indicated that the Company planned to provide a cost update within the 150-day post filing timeframe as allowed by PA 341.[19] As indicated by the schedule in this case, the Company agreed to provide any updated costs for the proposed project by December 19, 2017.

Q. Did the Company provide a cost update as indicated in its testimony?

A. No.

Q. Has the Company provided a schedule for the proposed project?

A. Yes. Company witness Fahrer addresses overall project timing in Company Exhibit A-42. This exhibit illustrates the expected timing for all aspects of the proposed project inclusive of DTE Board of Directors approval, CON process schedule, proposed project scope development, environmental permitting, MISO interconnection, contract execution, engineering and construction, and performance testing.

Q. Has DTE indicated the estimated cost for the construction of the proposed Project?

[19] Prefiled Direct Testimony and Exhibits of Irene M. Dimitry, p 34.
Prefiled Direct Testimony and Exhibits of Kevin J. Chreston, p 63.
Prefiled Direct Testimony and Exhibits of Dan O. Fahrer, p 10.

A. Company witness Fahrer has indicated that the expected cost of the Proposed Project is $989 million in nominal 2022 dollars.[20] The Company has indicated that $879 million represents the expected total cost of the EPC costs and the PIE costs combined. The remaining $110 million includes $55 million in owner costs and $55 million in contingency.[21] The estimated $989 million capital cost for the proposed project is not inclusive of Allowance for Funds Used during Construction (AFUDC).[22] Staff witness Robert Nichols will discuss the financing cost impact and related Staff recommendations for the proposed project.

Q. Does the estimated $989 million capital cost for the proposed project include the estimated $29.3 million needed for transmission network upgrades?

A. No, it does not. In response to Staff's discovery, the Company has indicated that it anticipates fully recovering the $29.3 million of estimated transmission network upgrade costs once the proposed project begins commercial operation.[23]

Q. Did the Company consult with the transmission owner, International Transmission Company (ITC), to confirm that the DNV GL Power Solutions estimates for transmission network costs were accurate?

A. No. In response to Staff discovery, the Company indicates that a definitive network upgrade cost will be developed by ITC through the MISO Generator Interconnection Application (GIA) process.[24]

[20] Prefiled Direct Testimony and Exhibits of Dan O. Fahrer, p 7.
[21] *Id.* at Exhibit A-43.
[22] *Id.* at p 8.
[23] Exhibit S-1.5
[24] Exhibit S-1.6

Q. Please further explain the contingency costs included in the Company's capital cost estimate.

A. The Company has included a contingency cost estimate of 6% of the project capital cost, an estimated $55 million.[25] According to the Company's response to Staff discovery, the contingency cost estimate is based upon a Risk Register.[26] The Risk Register includes 29 risk event descriptions that are evaluated for probability and potential cost impact.[27]

Q. Does Staff have any concerns regarding the Company's Risk Register included in Staff testimony as Exhibit S-1.8?

A. Yes. Staff would like to highlight three-line items on the Risk Register. The first item is line 1, "Final PIE/EPC pricing varies from CON filing due to unresolved scope issues at the time of price true up". Line 1 accounts for $11.2 million of the total contingency cost included in the application. This line item lists a contingency plan of action of updating the capital cost at or before the 150-day cost update provided in MCL 460.6s.(4)(c). Staff proposes to remove this line item because there appears to be no real basis for risk since the Company could have provided an updated cost.

The second item is line 2, "DTE scope pricing varies from CON filing". Line 2 accounts for $14 million of the total contingency cost included in the application. This line item includes two possible action plans if it were to occur. The first is to provide any cost impact as part of its 150-day cost update and the second is to

[25] Prefiled Direct Testimony and Exhibits of Dan O. Fahrer, p 10 and Exhibit A-43.
[26] Exhibit S-1.7
[27] Exhibit S-1.8

update the scope, competitive bid or Change Review Board (CRB) process. Staff proposes to remove this line item because Staff expects that the Company would first have to fully define its scope to allow for a robust competitive bid process to take place and if there is a resulting change in price, the possibility of a 150-day cost update allowed for the Company to adjust for any changes in costs associated with a slight scope adjustment, which it elected not to file.

The third item on the Risk Register is line 19, "Owner requires equipment substitutions or scope changes after negotiation[s] are completed". Line item 19 accounts for $12 million of the total contingency cost included in this application. Given that the scope is fully defined at the beginning of the project, this item should not put the proposed project cost at risk. Additionally, this item has a probability of 1.0 on the Risk Register. This seems to illustrate that the Company, for all intents and purposes, expects that this risk will occur. If the Company truly expects that such a risk will occur, there should be a procedure, process, or analysis put in place to mitigate that likelihood much earlier in the process. The Company's lack of adequate planning should not result in potential added expense to the ratepayer. Without a clear understanding about why the Company would require an equipment substitution and a demonstration showing that the resulting event is not a result of project mismanagement, it is impossible to know whether such a contingency is reasonable or prudent.

Q. Based upon Staff's discussion of the three Risk Register line items, does Staff recommend any adjustments to the Company's planning contingency?

A. Yes. Staff recommends reducing the Company's estimated contingency costs by $37.2 million which would allow the Company $17.8 million in contingency. Staff believes this should be sufficient due to the Company's decision to utilize either a BOP EPC approach or a full wrap EPC option, and fully recognizes that "the EPC will add contingency to cover the OEM (Original Equipment Manufacturer) performance risks as well as schedule and cash flow considerations."[28] As discussed by Company witness Fahrer, both contracting approaches would result in a fixed price contract. Therefore, a large portion of the Company's inherent risk is being deferred to the EPC supplier.[29] It would stand to reason that with the fixed price contract approach, real cost risk to the Company lies only within the "Owner's Cost".[30] The Owners Cost includes the cost of owner supplied equipment and services, consumables, during start-up and testing of the proposed project, management, owner's engineer, and contingency.[31]

Q. Has Staff recommended contingency in other CON cases?

A. Yes, Staff recommended planning contingency in Case No. U-18224, Upper Michigan Energy Resources Corporation's application. Staff believes that *reasonable* contingency can be included for planning purposes since CON cases are not ratemaking proceedings and the Company will only collect the actual amount spent when the proposed project is placed into service. Therefore,

[28] Prefiled Direct Testimony and Exhibits of Dan O. Fahrer p 5.
[29] *Id.*, at pp 6-7.
[30] *Id.*, at Exhibit A-43.
[31] *Id.*, at p 7.

planning contingency in this case is only placed into rate base if the contingency dollars are actually spent on this proposed project.

Q. Does Staff recommend any adjustments to the Company's total estimated cost of contingency for the proposed project?

A. Yes. Staff recommends the Commission reduce the Company's estimated cost of contingency downward from $55 million to $17.8 million. The resulting proposed project amount after the $37.2 million reduction is $951.8 million.

MCL 460.6s(7)

Q. How has DTE proposed to satisfy the requirement set forth in MCL 460.6s(7) requiring the Company to file reports with the Commission regarding the status of the project for which the certificates of necessity are being requested?

A. The Company has proposed to file a narrative report to the Commission on an annual basis. The report would highlight the status of the project and include cost and schedule updates.[32]

Q. Does Staff have any recommendations regarding the proposed project status reports that are to be filed with the Commission pursuant to MCL 460.6s(7)?

A. Due to the scale and capital investment of the proposed project, Staff recommends biannual review filings be posted to the docket for this case. Staff also recommends that the filings, at a minimum, include the status of the proposed project with any cost and schedule updates including any deviations from the originally estimated cost and schedule. Staff expects that the Company

[32] Exhibit S-1.9

will provide sufficient detail regarding the status and any changes to scope, timing or expected cost. Staff's goal is to maintain an open and transparent dialog with DTE through the duration of the project until the completion of all construction and the commencement of full commercial operation.

Staff also recommends the Company provide immediate communication to Staff if there is a significant change to the expected cost or timing that will have a large impact on the overall cost of the proposed project or the timing to completion.

Q. What is Staff's position on DTE's proposal to satisfy the requirement set forth in MCL 460.6s (7)?

A. It is Staff's opinion that the Company is able to comply with the reporting requirement set forth in MCL 460.6s (7) as well as Staff's reporting recommendations.

MCL 460.6s (11) (b)

Q. Did DTE's Integrated Resource Plan (IRP) contain an analysis of the type of generation technology proposed for the generation facility and the proposed capacity of the generation facility, including projected fuel and regulatory costs under various reasonable scenarios?

A. As previously stated, the Company provided a high-level description of the type of generation technology it is proposing. Through its IRP using the Strategist® model, the Company analyzed generation expansion plans optimized for reference case, high gas, low gas, emerging technology and aggressive CO_2 scenarios applying various sensitivities as shown in witness Chreston's Exhibit A-4, section

11.6. The model consistently selected a 2x1 H class in the optimized generation expansion plans for many of the various scenarios.

Q. Does Staff have additional comments about the scenarios and sensitivities the Company developed for its 2017 IRP?

A. In general, the Company explored many scenarios that provide insight into the resource requirements for a variety of future conditions. The inclusion of both high and low natural gas price analysis is critical when considering the historic volatility of natural gas prices. Staff witness Olumide Makinde will discuss the Company's natural gas price forecast further. The Emerging Technology scenario is beneficial to address unexpected advancements in renewable technology and the market impact such advancements may have. The aggressive CO_2 scenario is an indicator of the impact that increased CO_2 reduction would have on the generation fleet.

The Company also applied a number of sensitivities to the various scenarios including variable load growth, higher levels of renewable energy, increased energy efficiency[33], capital cost and size variations, and the return of electric choice customers. These sensitivities provide further information about how the Company's proposed project performs, within the model, under different future conditions.

[33] Energy Efficiency is synonymous with energy waste reduction throughout testimony.

Q. Does Staff have any concerns about the Company's modeling strategy used in its IRP?

A. Staff does have concerns about the Company's approach in modeling demand side resources. Witness Chreston states that energy efficiency and demand response were modeled on an "equal footing" to other supply side alternatives.[34] Staff's analysis indicates that this is not the case. Energy efficiency measures appear to be forced into the model as a demand modifier and are not modeled with incremental increases up to the cost-effective amount as indicated by the Michigan Lower Peninsula Electric Energy Efficiency Potential Study[35] for all scenarios. Staff's position regarding energy efficiency is addressed further by Staff witness Karen M. Gould. Demand response appears to be limited to existing programs within the model and is not allowed to increase through further participation in current programs or the implementation of new ones. Staff's position regarding demand response is addressed further by Staff witness Katie J. Smith.

Staff also has concerns with the modeled sizes of the generic resources. Although Staff does not have expertise in the Strategist® model, in some instances resource expansion models can be influenced by the specified size of the new resources available for the model to select. For instance, smaller resources are less expensive but if there are not enough of them to fill the entire need, the model

[34] Prefiled Direct Testimony and Exhibits of Kevin J. Chreston, pp 17-18.
[35] http://www.michigan.gov/documents/mpsc/MI_Lower_Peninsula_EE_Potential_Study_Final_Report_08.11.17_598053_7.pdf, August 11, 2017.

will select the larger, more expensive resource instead. Models do not typically overbuild unless they are forced to do so by the user. In this instance, the model may select the single large option that fills the entire need because the user did not offer enough smaller options to allow the model to diversify. If the model cannot solve the expansion plan using the limited number of smaller options, then it is forced to select the larger resource option as being the most economical. The model will not overbuild, therefore by selecting one large resource that fills the entire resource need, economical smaller resources would not be selected because they are no longer needed. One way to avoid such a situation is to model a generic combined cycle and a generic combustion turbine as smaller increments but allow the model to build multiple units in one year. This method allows for clear visibility around the actual amount of energy and capacity needed from larger generation options while still including any of the less expensive but smaller demand side options and additional renewable energy options that may be cost effective. In short, this method allows new resources to be selected on an equitable basis. With this approach, the number of generic, small combustion turbines or combined cycles built in a one or two-year period by the model can be totaled to determine the actual amount of large generation needed and the most appropriate design to serve the system need. The Company has not yet demonstrated or explained that it crafted its model to select resources on an equitable basis.

Q. With the implementation of PA 341, has the Commission provided guidance about IRP modeling?

A. Yes. The Commission order issued on November 21, 2017 in Case No. U-18418 provided modeling guidance for IRP modeling that included energy efficiency, demand response, and renewable energy. However, this order was not available to the Company when it conducted its IRP analysis prior to filing its application.

Q. Would Staff's modeling method lead a model to select a more cost-effective generation expansion plan?

A. It is true that the Company's proposed larger single natural gas generation resource would have an advantage of economies of scale resulting in a lower per megawatt cost as compared to the same technology in a smaller size. However, without running a scenario with the energy efficiency, demand response, and renewable energy resources as Staff has indicated and utilizing the generic resource method discussed above, the total cost of all resources combined is unknown. Some of the other resources likely have significantly less capital and operation and maintenance costs, but Staff acknowledges that these other options will not replace the 1100+ MW electric generating facility build requested in this filing. However, even nominal increases of energy efficiency, demand response, and renewable energy provide security and stability for the Company in meeting the energy needs of their customers. Implementing these resources now will delay, mitigate, or reduce future costs encumbered by the Company's customers and the need for future CON cases like this one. Additionally, such an approach diversifies a utility portfolio and reduces ratepayer exposure risk.

Q. Has the Company included a risk assessment that would consider the cost risk of the proposed project under various reasonable scenarios?

A. DTE has provided an analytic hierarchy process (AHP) and stochastic risk assessment to assess four significantly different plans[36]. The AHP "is a process that decomposes complex problems into a hierarchy of criteria and alternatives."[37] The stochastic analysis "uses probability distributions of key drivers to evaluate portfolios."[38]

Q. Did the Company use input from outside stakeholders regarding risk tolerance or key stakeholder concerns?

A. The Company has not indicated that it used stakeholder input in determining risk tolerance or directly integrated stakeholder concerns into its risk analysis. The Company's AHP analysis criteria was ranked by DTE internal experts while the stochastic analysis was performed by DTE's consultant PACE Global.

Q. Did the Company perform a risk analysis on optimized build plans that resulted from its modeled scenarios?

A. The Company selected four significantly different build plans that included the proposed project and three other alternatives. The three other alternatives all included a 950 MW combustion turbine plus a renewable or demand response resource.[39] These plans were not optimized generation plans or even near optimized expansion plans for any scenario in the Company's IRP. It is not clear exactly what the Company expected to determine from such a risk assessment. Staff views the purpose of a risk assessment as being two-fold. First, a risk

[36] Prefiled Direct Testimony and Exhibits of Kevin J. Chreston, Exhibit A-4, Section 12.
[37] *Id.*, at, Section 12.1.1.
[38] *Id.*, at Section 12.1.2.
[39] *Id.*, at Table 12.1.2-2.

assessment can be used to determine a build plan's sensitivity to specific future circumstances. Second a risk assessment can provide relative information about the potential cost of a future outcome being very different than expected. Specifically, the risk assessment can test the cost risk associated with one optimal build plan being placed in a drastically different future for the time-period in which a decision cannot be reversed. For some resources, this time-period is reasonably short, and it is likely the risk cost would be low. Other decisions are nearly irreversible once made and may impose significant cost if an alternative future becomes reality. Understanding cost risk in this way helps to determine if the least cost plan is truly the best plan when coupled with the understanding that the future is unknown. Specifically, it creates an understanding of the types of investments that may insulate the ratepayer from exposure to risk and the related costs.

Q. Did the Company include any build plan that included a combination of increased demand response, energy efficiency and renewable resources in its risk assessment?

A. No. The Company did not include a build plan that contained high renewable resources, increased energy efficiency and demand response resources simultaneously. Such a build plan may result in a lower cost and lower economic risk as compared to the build plans the Company analyzed because the combustion turbine size would decrease due to the increase in other resources. Without running the scenario, the exact amount is unknown.

MCL 460.6s (11) (f)

Q. Has the Company included an analysis of any available electric resources, including additional renewable energy, energy efficiency programs, load management, and demand response that could defer, displace or partially displace the proposed Project beyond the amounts discussed in MCL 460.6s (11) (c) and (e)?

A. The Company has provided an analysis of energy efficiency as a demand resource at various levels in many of the scenarios and as a sensitivity. The Company also provided an analysis withnd some increases in demand response through upgrading existing A/C switch infrastructure and minimal increases in other demand response programs. The Company has not modeled energy efficiency and demand response to the achievable and cost-effective amounts reported in the potential studies[40][41] directed by Act 342. In addition, the Company did not model these resource options simultaneously, at the amounts that Staff believes to be achievable and cost-effective, therefore Staff has no way of knowing if this type of multi- resource approach would be more cost-effective for the rate-payer than the Company's proposed project. Such an approach would allow for increased diversity of DTE's resource portfolio and help to minimize the risk associated with potentially volatile natural gas prices in the future.

[40] State of Michigan Demand Response Potential Study, http://www.michigan.gov/documents/mpsc/State_of_Michigan_-_Demand_Response_Potential_Report_-_Final_29sep2017__602435_7.pdf , September 29, 2017.
[41] Michigan Lower Peninsula Electric Energy Efficiency Potential Study, http://www.michigan.gov/documents/mpsc/MI_Lower_Peninsula_EE_Potential_Study_Final_Report_08.11.17_598053_7.pdf, August 11, 2017.

Q. Has Staff asked the Company to run a scenario that included increased demand response, energy efficiency and renewable resources simultaneously?

A. Yes. Staff did ask the Company if it would be willing to run an alternative scenario that would increase demand response, energy efficiency, and renewable resources. The Company refused Staff's request. The Company's responses are included in Exhibit S-1.10.

Q. Did the Company offer a response as to why it did not run a scenario as Staff describes?

A. Yes. The Company has indicated that its low load sensitivity is an adequate proxy for the scenario Staff has described.[42]

Q. Does Staff agree with the Company's assertion?

A. It is not clear that the low load sensitivity is an adequate proxy for the scenario Staff describes. It is true that increased energy efficiency and demand response increases would reduce the Company's peak demand. However, having not actually modeled such a scenario, and with the concerns about generic resource sizes, it is impossible to know the entire optimized resource expansion plan that would result. However, if the Company is correct in its assumption that the increased energy efficiency and demand response would be comparable to the low load demand results then, based upon the Company's own analysis, the Proposed Project would be postponed by one year, have virtually no reliance on market

[42] Exhibit S-1.10

purchases, and eliminate the need for additional large generation throughout the rest of the study period.[43]

MCL 460.6s (11) (g)

Q. Has the Company included an analysis of available transmission options in its IRP?

A. The Company has indicated an analysis of available transmission alternatives.[44] The analysis considered the current ITC transmission grid and import limit, the ability to deliver firm transmission supply to meet demand, existing interconnecting tie lines, the effects of DTE coal-fired retirements, and near and long-term transmission expansion plans as indicated through the MISO Transmission Expansion Planning (MTEP) process. The MTEP process is a process to ensure the reliable operation of the transmission system that would not necessarily indicate market or economic related options that might enable resources from outside MISO Local Resource Zone 7 to serve load within Local Resource Zone 7. However, if ITC did not reveal any such alternatives through discussion with the Company, then there is likely no known viable transmission alternative at this time.

Q. Does that conclude your testimony?

A. Yes, it does.

[43] Prefiled Direct Testimony and Exhibits of Kevin J. Chreston, Exhibit A-4, Table 11.6.1-2
[44] Prefiled Direct Testimony and Exhibits of William H. Damon III, Exhibit A-38, Section 6.3.

S T A T E OF M I C H I G A N

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

*** * * ***

In the matter of the application of	**)**	
DTE ELECTRIC COMPANY	**)**	
approval of Certificates of Necessity	**)**	**Case No. U-18419**
pursuant to MCL 460.6s, as amended,	**)**	
in connection with the addition of a	**)**	
natural gas combined cycle generating	**)**	
facility to its generation fleet and for	**)**	
related accounting and ratemaking	**)**	
authorizations.	**)**	

EXHIBITS OF

NAOMI J. SIMPSON

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

MPSC Case No.: U-18419
Respondent: M. E. Banks / Legal
Requestor: STAFF
Question No.: STDE-13.3
Page: 1 of 1

Question: Please identify the Make and Model of Advanced Class natural gas combustion technology that the Company is proposing to use. Please provide a more extensive list, than what is provided in witness Damon's testimony on page 20, of locations within the United States that utilize the same advanced class technology the Company is proposing with the same manufacturer installed in 2009 or later."

Answer: DTE Electric objects for the reason that the information requested consists of confidential, proprietary research and development of trade secrets or commercial information, the disclosure of which would cause DTE Electric and its customers competitive harm. Subject to this objection and without waiver thereof, the Company would answer as follows: The Company is currently in contract negotiations with the Original Equipment Manufacturer of the advanced class gas turbine and disclosure of this information at this time would compromise the Company's ability to maintain a competitive negotiating position for the ultimate benefit of rate payers. Once negotiations have completed and contract(s) are executed, the Company is willing to fully answer this question.

MEP Permit Matrix Template

Project Name New Generation 1 **Date** 1/27/2017

Stakeholders

Potential Requirements	Owner	EM&R	Regional Relations	Contractor	DECo	Mich Con	Community	Local Jurisdiction	County	State	Federal
Air Quality Federal	N/A										
Air Quality State (Permit to Construct)	DTE	X			FosGen					MDEQ	
Boiler Permit (Non-HVAC)	N/A										
Building Permits - Electrical	EPC			EPC				E. China Twp.			
Building Permits - Elevator	EPC			EPC				E. China Twp.		X	
Building Permits - Fire Protection	EPC			EPC				E. China Twp.			
Building Permits - Mechanical	EPC			EPC				E. China Twp.			
Building Permits – Mechanical (HVAC)	EPC			EPC				E..China Twp.			
Building Permits - Sewer Tap	DTE		X						Health Dpt		
Building Permits - Structural	DTE		X					E China Twp.			
Building Permits - Water Tap	DTE		X						Health Dpt		
Coastal Zone Management	N/A										
County Drain	DTE								Health Dpt		
Cultural resources (SHPO)	N/A						X				

Potential Requirements	Owner	EM&R	Regional Relations	Contractor	DECo	Mich Con	Community	Local Jurisdiction	County	State	Federal
Demolition-General	DTE			EPC				E China Twp.			
Demolition- Asbestos (MIOSHA/ NESHAPS)	DTE			Abatement						DEQ	
Demolition – Explosives (Transport/Storage)	N/A										
Demolition-Fuel Storage Tanks	N/A										
Demolition-Lead Abatement	DTE			Abatement							
Drains (County)	DTE	X							Health Dpt		
Drains (Municipal)	N/A										
Endangered Species Federal	DTE	X									
Endangered Species State	DTE	X									
Erosion Control Sedimentation County	DTE	X							Health		
Erosion Control Sedimentation State	N/A										
Dam Safety Permits	N/A										
Fence Permits	N/A										
Flood Plain Management	DTE									MDEQ	
Hazardous Materials (HAZMAT)	N/A										
International Waterways	N/A										
Local Woodlands	N/A										
Marking and lighting of Tall Structures F.A.A.	DTE		X								FAA
Marking and lighting of Waterways	N/A										
Mineral Management	N/A										
NPDS – Major/Minor	DTE	X								MDEQ	
NPDS –Water Discharge	DTE	X								MDEQ	
Paving Permit (Local Ordinance)	DTE		X				Planning	E China Twp.			

Potential Requirements	Owner	EM&R	Regional Relations	Contractor	DECo	Mich Con	Community	Local Jurisdiction	County	State	Federal
Nuclear Equipment	N/A										NRC
Planning/Zoning (Local Ordinances)	DTE		X				Planning	E China Twp			
Public Lighting (Interruption/ Modification)	N/A		X				Planning	E China Twp			
Railroad Crossings	N/A										
Right of Way Easements	DTE		X					(RR/gas/com)			
Road Crossings/ Curb Cut - Local	N/A										
Road Crossings/Curb Cut - County	N/A										
Road Crossings/Curb Cut - State	N/A										
Signage Permit(Local Ordinance)	DTE		X					E China Twp	MDOT		
Sanitary Discharge/Removal (Pump/Haul)	DTE	X							Health Dpt		
Stream/Drain Crossing County	DTE	X							Health Dpt		
Stream Crossing Federal	N/A										
Stream Crossing- State	N/A								Health Dpt		
Storm Water Discharge (Run-off)	DTE	X							Health Dpt		
Wild and Scenic rivers	N/A										
Wetlands - Local	DTE	X							Health Dpt		
Wetlands - State	N/A										
CERTIFICATE OF OCCUPANCY	DTE		X					E.China Twp.			

MPSC Case No.: U-18419
Respondent: W. H. Damon
Requestor: STAFF
Question No.: STDE-6.22
Page: 1 of 1

Question: Provide a description of each permit listed on page 13, line 13 through page 14, line 4 of the Direct Testimony of William H. Damon III.

Answer:

- Permit to Install / New Source Review Air Permit – This permit identifies emissions sources, emission rates and testing requirements associated with the emissions sources for the Proposed Project.
- Modifications of the BLRPP NPDES Permit for Water Discharge – This permit identifies changes to the existing BLRPP permit for water discharge from the Proposed Project
- Joint Permit for Work in Inland Lakes and streams, Great Lakes, Wetlands, Floodplains, Dams, High Risk Erosion Areas, and Critical Dune Areas – This permit identifies primarily wetlands being disturbed and any associated mitigation required.
- Soil Erosion and Sediment Control and Storm Water (NPDES II) Permit and Site Plan Preliminary Approval – this permit is for construction and permanent storm water discharge from the Proposed Project.
- Building Permits – these are for permanent buildings that are part of the permanent plant site for the Proposed Project.
- FAA Permit – this permit seeks approval from FAA regarding the location and height of tall structures (such as exhaust stack, HRSG, cooling tower) and to ensure that they are not constructed in known flight path. FAA may advice on structures within the project site that may need lighting or special identification to warn aircrafts.
- Other Permits – see the Company's response to STDE-6.23.

MPSC Case No.: U-18419
Respondent: D. O. Fahrer
Requestor: STAFF
Question No.: STDE-2.20
Page: 1 of 4

Question: Please provide evidence of the Company's competitive bid process for both large components and EPC contractors. Describe the company's process including the number of respondents, and specific RFP parameters set by the Company for guidance to respondents.

Answer: The Company utilizes PowerAdvocate, Inc. to facilitate its competitive bidding process (RFP process). The PowerAdvocate website provides access controls that comply with the Company's confidentiality policies to prevent disclosure of proprietary and confidential information.

Two RFP's were issued for the Proposed Project through the PowerAdvocate website including one for the Power Island Equipment (large components) and one for the EPC contracts. Respondents to the RFP's were required to submit their proposals to the Company through the PowerAdvocate website.

The Company's RFP process includes the following:

- Scope of Work. A document providing a detailed explanation of technical and commercial requirements to be submitted in respondent's proposals.

- RFP Schedule. A schedule defining timing requirements and dates for the RFP process including:

  1. RFP Release;
  2. Pre-bid conference;
  3. Notice of Intent to Bid;
  4. Bid Due date;
  5. Short List Notification date (Estimated based on the proposal evaluation).

- Pre-bid Conference. A meeting with all qualified contractors selected to participate in the RFP process to review the scope of work, dates and to provide opportunity for Q&A. Materials from the pre-bid conferene meeting and a record of all questions asked and the response to all questions asked are incorporated into the PowerAdvocate RFP database.

MPSC Case No.: U-18419
Respondent: D. O. Fahrer
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Question No.: STDE-2.20
Page: 2 of 4

- Confidentiality of Proprietary Information. The Company takes reasonable measures to prevent the disclosure of confidential and proprietary information contained in proposals provided by contractors.

- Proposal Content Requirements and Submission Procedure. The RFP required that proposals be organized in a manner that facilitates efficient evaluation of proposals.

- Proposal Validity. DTE required proposals to be valid for a period sufficient to allow for proposal evaluation, Certificate of Necessity timeline and DTE internal required reviews.

- Evaluation Methodology. The qualified RFP respondents are provided with the methodology that will be used to evaluate their proposals including an assessment of both price and non-price factors.

Based on market analysis of known providers, the Company invited three original equipment manufacturers "OEM's" to participate in the Power Island Equipment (PIE) RFP. The RFP was issued to obtain firm fixed price bids for the design, manufacture, delivery, and support of commissioning for the Power Island Equipment (including the Combustion Turbine Generators, the Heat Recovery Steam Generators, the Steam Turbine Generator, and the Distributed Cotrol System). The Company required the RFP responses to include the following parameters:

1. Proposal Summary
2. Project Staffing
3. Division of Responsibility (DOR)
4. Relevant Experience
5. Project Management Experience
6. Technical Design Data
7. Schedule and Lead Times
8. Quality
9. Installation description of Power Island
10. Warranty and Services
11. Michigan Location and Labor Utilization

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12. Pricing
13. Project Execution Liquidated Damages
14. Training Program
15. Recommended Spares
16. Maintenance Tools
17. Background Checks and Site Requirements
18. Exceptions to Purchase and Services Agreement
19. Diversity
20. Environmental Sustainability
21. Technical Clarifications and Exceptions
22. LTSA Requirements

To identify qualified bidders for the EPC contract, the Company invited interested contractors to submit their qualifications in a Request for Information (RFI) through the PowerAdvocate website. Sixty contractors accessed the RFI on PowerAdvocate. Of the sixty contractors, fourteen submitted their qualifications. Based on a review of the fourteen RFI participants, eight contractors were invited to participate in the Request for Proposal "RFP". The following criteria was used by the Company to evaluate the qualifications of the RFI participants:

1. Experience in providing engineeing, procurement, and construction services for natural gas fueled combined cycle power plant facilities
2. Past performance
3. Ability to deliver
4. Safety
5. Financial credit worthiness

The EPC RFP required the respondents to provide the following in order to be considered a conforming bid response:

- Firm fixed price bid for engineering (including integration of the owner suppled PIE), procurement of balance of plant equipment, and construction of the Proposed Project. The EPC RFP response was required to include separate proposals for two PIE arrangements under consideration by the Company.

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- Firm fixed price full wrap for engineering (including integration of the PIE), procurement of the PIE and balance of plant equipment, and construction of the Proposed Project. The Company did not restrict the EPC to a specific PIE arrangement or manufacturer.

In addition, the Company required the RFP responses to include the following parameters:

1. Proposal Summary
2. Profile of Contractor
3. Project Staffing
4. Program Management Execution
5. Safety Record
6. Construction and Work Plans
7. Project Execution
8. Schedule
9. Michigan Labor
10. Michigan Spend
11. Diverse Supplier Participation
12. Pricing, Payment and Alternates
13. Exception to DTE form Agreement or other documents in this RFP
14. Contractor Financial Information Requirements
15. Value Engineering

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Requestor: STAFF
Question No.: STDE-10.1d
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Question: Please refer to E.P. Weber's testimony on pages 9-11.

d) What portion of the $29.3 million is included in the total project estimate of $989 million?

Answer: The Company anticipates full recovery of the $29.3 million of estimated transmission network upgrade costs through the refund allowed under Attachment FF Section III. A.2.d.4 of the MISO Tariff. As such, the $29.3 million is not included in the $989 million.

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Respondent: D. O. Fahrer/E. P. Weber
Requestor: STAFF
Question No.: STDE-10.1b
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Question: Please refer to E.P. Weber's testimony on pages 9-11.

b) Did the Company consult with ITC regarding the expected transmission network upgrade costs? If so, provide a summary of the consultation. Did ITC confirm that the DNV GL Power Solutions estimates were accurate?

Answer: The Company did not consult with the ITC regarding the expected transmission network upgrade costs. The ITC did not confirm DNV GL Power Solutions estimates. A definitive estimate of network upgrade costs will be developed by the ITC through the MISO Generator Interconnection Application (GIA) process. The Company submitted a GIA application to MISO on June 5, 2017.

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Respondent: D. O. Fahrer
Requestor: STAFF
Question No.: STDE-10.2b
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Question: Please reference witness Fahrer's testimony on page 10.

b) Is the contingency amount of 6% applied to the whole project cost including the EPC balance of plant portion?

Answer: The Company developed a risk register of risks that would be borne by the Company for the Proposed Project (supplied with the Company's response to STDE-10.2a as attachment U-18419 STDE-10.2a Risk Register.xlsx). The risk register was evaluated for probability and potential impact to cost. From the evaluation of the risk register, the Company determined a Company held contingency of $55 million was sufficient to ensure a high probability of success for the project. The $55 million contingency equates to 6% of total project capital cost before contingency.

Exhibit S-2.8 U-18419

U-18419 STDE-10.2a Risk Register Risk Register

Proposed New Combined Cycle Power Plant: Risk Register

Date: July 21, 2017

Date: July 21, 2017

			Impacts											Financial Analysis							Schedule Analysis				Risk Closure	
#	Risk Event Description What is the event?	Category Sub-project, Project Phase, Location etc. (Optional)	Likelihood	Schedule	Cost	Quality	Safety	Scope	Total Score	Risk Event Drivers What are the conditions, actions, or events that are likely to trigger the risk event to occur or is a leading indicator to the risk event occurring?	Response/ Mitigation Strategy What action(s) will be taken to limit the likelihood of these event occurring or limiting the impacts?	Contingency Plan What action(s) will be taken if this event occurs?	Owner	Risk Timeframe Critical date(s) or period of exposure	Comments	FA Review Required?	$ Impact (millions)	Source	Probability	Source	EMV	FA Comments	Scheduler Review Required?	Critical Path ?	Scheduler Response	Scheduler Comments (Activity #, Quntified impact etc.)	Closure Statement	Notes / Lessons Learned
1	Final PIE/EPC pricing varies from CON filing due to unresolved scope issues at the time of price true up	Price/Market/Financial	H	L	H	L	L	M	55	**Drivers to monitor:** -Bid response reviews are continuing, expected scope adjustments are indicative, technical exceptions under review, final negotiations have not started **Drivers that have occurred:**	**Planned Actions:** - Competitive RFP process, Joint review of scope and DOR with lead PIE/EPC, OE detailed review of bid estimates and exceptions, fixed price contract structure **Completed Actions:**	**Planned Actions:** - Pre 150 day update captial cost -		11/30/2017	Update CON filing price within the 150 days allowed by CON process	Y	$ 37.4	PM input	0.3	FA Input	$ 11.2	Risk Workshop Integrated team approach	Y					
2	DTE scope pricing varies from CON filing (current estimates are ROMs)	Price/Market/Financial	H	L	H	L	L	M	55	**Drivers to monitor:** -Internal estimates are still under development **Drivers that have occurred:** -	**Planned Actions:** - DTE and OE detailed review of owners scope and estimates, competitive RFP process **Completed Actions:**	**Planned Actions:** Pre 150 day update captal cost Post 150 day adjust scope, competitive bid, or CRB process		11/30/2017	Update CON filing price within the 150 days allowed by CON process	Y	$ 27.9	PM input	0.5	FA Input	$ 14.0	Risk Workshop Integrated team approach	Y					
3	Natural gas commodity and transportation prices are higher than planned increasing startup / commissioning cost	Price/Market/Financial	M	L	H	L	L	L	27	**Drivers to monitor:** - Major disruptions in markets, gas futures **Drivers that have occurred:** -	**Planned Actions:** - Establish firm gas supply and transport agreements through competitive bidding process **Completed Actions:**	**Planned Actions:** - CRB process -		6/29/2018	Gas supply and transport agreements expected to be in place by end of Q2 2018	Y	$ 3.1	PM input	0.1	FA Input	$ 0.2	Risk Workshop Integrated team approach	N					
4	Changes in trade agreements impact tariffs for imported goods, increasing prices resulting in a change order	Price/Market/Financial	L	L	H	L	L	L	9	**Drivers to monitor:** - State and Federal legislation and agency activities **Drivers that have occurred:**	**Planned Actions:** - Monitor State and federal legislation and agency activities	**Planned Actions:** - Explore options - CRB Process				Y	7.2	PM input	0.1	FA Input	$ 0.4	Risk Workshop Integrated team approach	N					
5	An insurable event causing damage to the facility occurs requiring DTE to pay a deductible	Price/Market/Financial	L	M	H	L	M	L	13	**Drivers to monitor:** - Human performance, site conditions **Drivers that have occurred:** -	**Planned Actions:** - Safety plan, safety observations - Human Performance observations **Completed Actions:**	**Planned Actions:** Investigate event and take appropriate actions and file insurance claim - CRB Process				Y	4.0	PM input	0.1	FA Input	$ 0.2	Risk Workshop Integrated team approach	N					
6	An event causing damage to the facility below the insurance deductible occurs requiring DTE to pay for repairs	Price/Market/Financial	M	L	H	L	M	L	33	**Drivers to monitor:** - Human performance, site conditions **Drivers that have occurred:** -	**Planned Actions:** - Safety plan, safety observations - Human Performance observations **Completed Actions:**	**Planned Actions:** Investigate event and take appropriate actions - CRB Process				Y	4.0	PM input	0.1	FA Input	$ 0.2	Risk Workshop Integrated team approach	N					
7	DTE submittal review turn around is slow causing EPC delays /cost	Owner Delays	H	M	H	L	L	L	55	**Drivers to monitor:** - Internal resource availability, schedule **Drivers that have occurred:** -	**Planned Actions:** - Work with COE's to ensure adequate resources are available when needed, plan resources in IRP, DTE rely on HDR for design reviews, minimize required reviews **Completed Actions:**	**Planned Actions:** - Utilize schedule float - CRB Process				Y	$ 3.0	PM input	0.5	FA Input	$ 1.5	Risk Workshop Integrated team approach	Y					
8	Interveners are able to cause CON approval delays (with schedule recovery possible).	Owner Delays	L	M	H	L	L	L	11	**Drivers to monitor:** - CON process **Drivers that have occurred:**	**Planned Actions:** - Manage regulatory process **Completed Actions:**	**Planned Actions:** - Utilize schedule float, Reduce reviews required				Y	$ 1.0	PM input	0.1	FA Input	$ 0.1	Risk Workshop Integrated team approach	N					
9	DTE/Craft Union Labor Strike	Owner Delays	L	H	H	L	L	L	13	**Drivers to monitor:** - Labor agreements for unions **Drivers that have occurred:** -	**Planned Actions:** - Manage DTE contracts, monitor other contracts, maintain relationship with craft labor unions (tripartites) **Completed Actions:**	**Planned Actions:** - Utilize schedule float - CRB Process				Y	$ 0.8	PM input	0.1	FA Input	$ 0.0	Risk Workshop Integrated team approach	Y					
10	Start up / commissioning Delays by Owner	Owner Delays	H	M	H	L	L	L	55	**Drivers to monitor:** - Delivery of spare parts and supplies, MISO GIA, ITC construction, FERC approvals, Gas Supply contract and construction; Start up schedule coordination **Drivers that have occurred:**	**Planned Actions:** - Monitor and influence external processes (MISO, ITC FERC), Maage spare parts procurement, Manager start up coordination activities **Completed Actions:**	**Planned Actions:** - Utilize schedule float - CRB Process				Y	$ 1.8	PM input	0.9	FA Input	$ 1.5	Risk Workshop Integrated team approach	Y					
11	Adjacent hazzard(s) cause potential for shutdown of construction and schedule delays resulting in a change order	Owner Delays	L	L	L	L	L	L	5	**Drivers to monitor:** - Maintain awareness of adjacent facilities plans **Drivers that have occurred:**	**Planned Actions:** - Coordinate plans with adjacent facilities - Maintain established site separation agreement	**Planned Actions:** - Explore options - CRB Process				Y	2.3	PM input	0.1	FA Input	$ 0.1	Risk Workshop Integrated team approach	N					
12	Owner delays/suspends site work	Owner Delays	L	L	L	L	L	L	5	**Drivers to monitor:** - Contractor safety performance and compliance with laws and permits **Drivers that have occurred:**	**Planned Actions:** Monitor contractor safety program Monitor contractor compliance with permits, laws, regulations	**Planned Actions:** - Explore options - CRB Process				Y	0.3	PM input	0.1	FA Input	$ 0.0	Risk Workshop Integrated team approach	N					
13	Owner caused labor constraints (resources pulled to work on outages or other priority)	Owner Delays	L	M	L	L	L	L	7	**Drivers to monitor:** - Planned outages at other facilities **Drivers that have occurred:**	**Planned Actions:** - Coordinate plans with other facilities -	**Planned Actions:** - Explore options - CRB Process				Y	2.3	PM input	0.1	FA Input	$ 0.1	Risk Workshop Integrated team approach	N					
14	Owner's cost for startup (fuel/consumbles) increase due to a performance re-test	Scope	M	L	H	M	L	L	33	**Drivers to monitor:** - Start up readiness, commissioning activities **Drivers that have occurred:** -	**Planned Actions:** - Monitor commissioning activities and start up readiness utilizing PDRI process **Completed Actions:**	**Planned Actions:** - CRB Process				Y	$ 1.8	PM input	0.3	FA Input	$ 0.5	Risk Workshop Integrated team approach	N					
15	Difficulty operating new technology extending start-up / commissioning resources from PIE/EPC	Scope	L	M	L	M	L	L	9	**Drivers to monitor:** - Operator training and readiness **Drivers that have occurred:** -	**Planned Actions:** - Monitor training activities and start up readiness utilizing PDRI process **Completed Actions:**	**Planned Actions:** - CRB Process				Y	$ 0.1	PM input	0.1	FA Input	$ 0.0	Risk Workshop Integrated team approach	N					
16	Concerns with stack requires repainting of stacks	Scope	L	L	L	L	L	L	5	**Drivers to monitor:** - FAA permitting process **Drivers that have occurred:**	**Planned Actions:** - Review FAA rules **Completed Actions:**	**Planned Actions:** - CRB Process				Y	$ 0.0	PM input	0.1	FA Input	$ 0.0	Risk Workshop Integrated team approach	N					
17	Issues with geotechnical data and analysis impact EPC scope and cost	Scope	M	M	H	L	L	L	33	**Drivers to monitor:** - Issues identified through additional soil borings and analysis **Drivers that have occurred:**	**Planned Actions:** Complete additional soil borings early in process **Completed Actions:** - Completed initial soil borings for RFP process	**Planned Actions:** - CRB Process				Y	$ 12.0	PM input	0.3	FA Input	$ 3.0	Risk Workshop Integrated team approach	N					
18	Changes in water data impact treatment facility design increaseing scope and cost	Scope	L	L	H	L	L	L	9	**Drivers to monitor:** - Water sampling data **Drivers that have occurred:** -	**Planned Actions:** - Continue to collect and analyze water samples- **Completed Actions:** - Water sample data included in RFP process	**Planned Actions:** - CRB Process -				Y	$ 1.0	PM input	0.1	FA Input	$ 0.1	Risk Workshop Integrated team approach	N					
19	Owner requires equipment substitutions or scope changes after negotiation are completed	Scope	H	L	H	M	L	M	65	**Drivers to monitor:** -Technical specification negotiations, engineeing and procurement processes **Drivers that have occurred:** -	**Planned Actions:** - DTE and OE detailed review of bid technical offering, scope and exceptions **Completed Actions:** -	**Planned Actions:** Require business case to support change - CRB process				Y	$ 12.0	PM input	1.0	FA Input	$ 12.0	Risk Workshop Integrated team approach	Y					
20	Changes in code / regulations result in additional cost	Scope	H	H	H	L	L	M	75	**Drivers to monitor:** - Regulators change a code or regulation **Drivers that have occurred:**	**Planned Actions:** - Monitor regulations and code **Completed Actions:**	**Planned Actions:** - Request waiver, explore alternatives - CRB Process				Y	$ 12.0	PM input	0.3	FA Input	$ 3.0	Risk Workshop Integrated team approach	Y					
21	Uknown underground conditions / contamination cause project delays / mitigation cost	Scope	M	H	M	L	L	M	39	**Drivers to monitor:** Soil borings identify issue, escavation identifies issue **Drivers that have occurred:** Preliminary soil borings did not identify an issue, Owner's knowledge indicates no issues	**Planned Actions:** - Monitor additional soil borings, monitor escavation process **Completed Actions:** -	**Planned Actions:** - Exploer options for mitigation - CRB process				Y	$ 6.0	PM input	0.3	FA Input	$ 1.5	Risk Workshop Integrated team approach	Y					
22	Discovery of artifacts on site cause construction delays / cost	Scope	L	M	L	L	L	L	7	**Drivers to monitor:** - Soil borings identify issue, escavation identifies issue **Drivers that have occurred:** - National Registor of Hitoric Properties survey completed, Owner's knowledge indicates no issues	**Planned Actions:** - Phase 1 archaeology survey if needed, review NHRP if needed, monitor additional soil borings, monitor escavation process **Completed Actions:** -	**Planned Actions:** - Explore options for mitigation, negotiate plan with State - CRB Process			This risk item only assumes an event that can be overcome and still meet the desired COD.	Y	$ 0.5	PM input	0.1	FA Input	$ 0.0	Risk Workshop Integrated team approach	N					
23	MISO DPP Studies indicate affected system upgrade costs or additional ITC costs that are not reimbursable	Scope	H	L	H	L	L	M	55	**Drivers to monitor:** - MISO GIA process **Drivers that have occurred:** -	**Planned Actions:** - Actively monitor MISO process, Communicate as appropriate with ITC **Completed Actions:**	**Planned Actions:** - Work with ITC on options - CRB Process				Y	$ 10.5	PM input	0.5	FA Input	$ 5.3	Risk Workshop Integrated team approach	Y					

Michigan Public Service Commission
DTE Electric
Risk Register

Case: U-18419
Witness: N. J. Simpson
Exhibit: S-1.8
Page 2 of 3

#	Risk Event Description What is the event?	Category Sub-project, Project Phase, Location etc. (Optional)	Impacts: Likelihood	Schedule	Cost	Quality	Safety	Scope	Total Score	Risk Event Drivers What are the conditions, actions, or events that are likely to trigger the risk event to occur or is a leading indicator to the risk event occurring?	Response/ Mitigation Strategy What action(s) will be taken to limit the likelihood of these event occurring or limiting the impacts?	Contingency Plan What action(s) will be taken if this event occurs?	Owner	Risk Timeframe Critical date(s) or period of exposure	Comments	Financial Analysis: FA Review Required?	$ Impact (millions)	Source	Probability	Source	EMV	FA Comments	Schedule Analysis: Scheduler Review Required?	Critical Path ?	Scheduler Response	Scheduler Comments (Activity #, Quntified impact etc.)	Risk Closure: Closure Statement	Notes / Lessons Learned
24	Air permit activities increase due to public comments / interveners	Scope	L	L	L	L	L	5	Drivers to monitor: -Air permitting process Drivers that have occurred: -	Planned Actions: - Monitor air permitting process -	Planned Actions: - Explore options - CRB Process				Y	$ 0.3	PM input	0.1	FA Input	$ 0.0	Risk Workshop Integrated team approach	N					
25	Water permit activities increase due to public comments / interveners	Scope	L	L	L	L	L	5	Drivers to monitor: - NPDES permitting process Drivers that have occurred: -	Planned Actions: - Monitor water permitting process -	Planned Actions: - Explore options - CRB Process				Y	$ 0.3	PM input	0.1	FA Input	$ 0.0	Risk Workshop Integrated team approach	N					
26	Air permit parameters change from values in contractual guarantees during air permitting process resulting in a change order	Scope	L	M	M	L	L	M	11	Drivers to monitor: - Air permitting process Drivers that have occurred: -	Planned Actions: - Moitor air permitting process -	Planned Actions: - Explore options - CRB Process				Y	3.0	PM input	0.1	FA Input	$ 0.2	Risk Workshop Integrated team approach	N					
27	Issues occur with other permits	Scope	L	L	L	L	L	5	Drivers to monitor: - Permitting requirements Drivers that have occurred: -	Planned Actions: - Monitor permitting processes -	Planned Actions: - Explore options - CRB Process				Y	0.2	PM input	0.1	FA Input	$ 0.0	Risk Workshop Integrated team approach	N					
28	Extreme weather conditions occur resulting in construction delays	Scope	L	M	M	L	M	L	11	Drivers to monitor: - Weather Drivers that have occurred: -	Planned Actions: - Monitor weather forecast to minimize impacts -	Planned Actions: - CRB Process -				y	1.1	PM input	0.1	FA Input	$ 0.1	Risk Workshop Integrated team approach	N					
29	Additional analysis determines that dock improvements are needed to accommodate the heavy loads being delivered by barge	Scope	L	L	M	L	L	L	7	Drivers to monitor: - Delivery logistic/heavy haul plan Drivers that have occurred: -	Planned Actions: - Work with EPC on logistics plan -	Planned Actions: - CRB Process -			Continue to work with EPC on logistics plan	Y	0.5	PM input	0.1	FA Input	$ 0.0	Risk Workshop Integrated team approach	N					
30									0	Drivers to monitor: - Drivers that have occurred: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
31									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
32									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
33									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
34									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
35									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
36									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
37									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
38									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
39									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
40									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
41									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
42									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
43									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
44									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
45									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
46									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
47									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
48									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
49									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
50									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
51									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
52									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
53									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
54									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
55									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
56									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
57									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
58									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
59									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
60									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
61									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
62									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
63									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
64									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
65									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
66									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
67									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
68									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					

				Impacts											Financial Analysis							Schedule Analysis				Risk Closure	
#	Risk Event Description What is the event?	Category Sub-project, Project Phase, Location etc. (Optional)	Likelihood	Schedule	Cost	Quality	Safety	Scope	Total Score	Risk Event Drivers What are the conditions, actions, or events that are likely to trigger the risk event to occur or is a leading indicator to the risk event occurring?	Response/ Mitigation Strategy What action(s) will be taken to limit the likelihood of these event occurring or limiting the impacts?	Contingency Plan What action(s) will be taken if this event occurs?	Owner	Risk Timeframe Critical date(s) or period of exposure	Comments	FA Review Required?	$ Impact (millions)	Source	Probability	Source	EMV	FA Comments	Scheduler Review Required?	Critical Path ?	Scheduler Response	Scheduler Comments (Activity #, Quntified impact etc.)	Closure Statement	Notes / Lessons Learned
69									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
70									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
71									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
72									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
73									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
74									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
75									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
76									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
77									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
78									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
79									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
80									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
81									0	Drivers to monitor: -	Planned Actions: -	Planned Actions: -				N	$ -	Default	0.0	Default	$ -		N					
82									0	Drivers to monitor: - Drivers that have occurred: -	Planned Actions: - - Completed Actions: -	Planned Actions: - -				N	$ -	Default	0.0	Default	$ -		N					
83									0	Drivers to monitor: - Drivers that have occurred: -	Planned Actions: - - Completed Actions: -	Planned Actions: - -				N	$ -	Default	0.0	Default	$ -		N					
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	Closed Risks															Closed Risks											

Open Item
Completed Activity

$ 54.7

MPSC Case No.: U-18419
Respondent: D. O. Fahrer
Requestor: STAFF
Question No.: STDE-12.36
Page: 1 of 1

Question: How does the Company propose to satisfy the requirement set forth in MCL 460.6s Subsection (7) regarding filing annual reports to the Commission on the status of the proposed project, including cost and schedule updates?

Answer: The Company proposes a narrative report be filed to the Commission on an annual basis. The report would describe progress made on the project and would provide an update on schedule and cost.

Respondent: K. J. Chreston/D. D. Kirchner
T. L. Schroeder/K. L. Bilyeu
Requestor: STAFF
Question No.: STDE-15.1a-c
Page: 1 of 2

Question: Has the Company run a single scenario where all of the following were modelled in one scenario? Please explain why or why not.

a. Energy waste reduction reaches 2% by 2021 and is maintained at that level through the study period using program costs consistent with the energy waste reduction potential study2;

b. Demand response programs reach 5.8% of peak demand by 2023 and are maintained throughout the study period where program costs are consistent with the demand response potential study3;

c. Renewable energy reaches 20% by 2029 and REC banking ceases in 2029 as well.

Answer: No. As described in detail in Exhibit A-4 2nd Revised - DTE Electric Integrated Resource Plan Report, Section 11 "Integrated Resource Plan Modeling," a multi-step assessment of options was conducted which included several steps of value screening that informed the selection of scenario/sensitivity cases to run. This approach was taken because the amount of scenario/sensitivity cases would go up exponentially if all possible multiple combinations were to be run, exceeding time and resource constraints with little to no benefit.

A proxy for a scenario that includes energy waste reduction, demand response and renewables in combination as described above is the low load sensitivity run by the Company. The low load sensitivity simulated a lower demand for capacity and energy which is similar to the conditions which would result from the suggested combination. In addition, increased amounts of renewable resources and demand response programs were available on the 2% EE sensitivity and were not economically selected by the Strategist model in the pertinent planning period, thus providing further assurance that the optimal plan was selected.

Incremental renewable energy beyond the 15% mandate would likely occur after 2021- having little impact, if any, on the Company's stated capacity need starting in 2022. The demand response programs in the Company's 2017 Refresh Scenario are approximately 6.19% of system peak in 2023

Respondent: K. J. Chreston/D. D. Kirchner
T. L. Schroeder/K. L. Bilyeu
Requestor: STAFF
Question No.: STDE-15.1a-c
Page: 2 of 2

and are maintained throughout the study period. It is also important to note that the energy waste reduction potential study and demand response potential study referenced in a and b above were completed well after the 2017 IRP was completed.

Respondent: K. J. Chreston
Requestor: STAFF
Question No.: STDE-15.2
Page: 1 of 1

Question: Has the Company run such a scenario with a high gas sensitivity consistent with EIA's Annual Energy Outlook high gas forecast?

Answer: No.

Respondent: K. J. Chreston/Legal
Requestor: STAFF
Question No.: STDE-15.3
Page: 1 of 1

Question: If the Company has not run such a scenario, would the Company be willing to run such a scenario with a nominal gas forecast and with a high gas price sensitivity where the price forecast is consistent with EIA AEO 2017 projections and file the results in rebuttal testimony? If not, please explain the reasons why not.

Answer: DTE Electric objects for the reason that the interrogatory is outside the scope of proper discovery since it does not seek to discover existing information, which is all any party is obliged to furnish under well-established rules of discovery pursuant to MCR 2.302(B). Subject to this objection and without waiver thereof, the Company would answer as follows: The Company has already submitted a wide range of gas prices in the IRP included in this CON filing. The EIA AEO 2017 forecast falls in between the DTE Reference Scenario and the DTE High Gas Scenario. Since CCGT was selected in both of these scenarios, it follows that CCGT would be selected in the EIA AEO 2017 forecast as well. Therefore, running a scenario consistent with EIA AEO 2017 projections would be redundant and provide no additional information of any value to what DTE Electric has already submitted in this CON filing.

MPSC Case No.: U-18419
Respondent: K. J. Chreston/Legal
Requestor: STAFF
Question No.: STDE-15.3 Supplemental
Page: 1 of 1

Question: If the Company has not run such a scenario, would the Company be willing to run such a scenario with a nominal gas forecast and with a high gas price sensitivity where the price forecast is consistent with EIA AEO 2017 projections and file the results in rebuttal testimony? If not, please explain the reasons why not.

Answer: DTE Electric objects for the reason that the interrogatory is outside the scope of proper discovery since it does not seek to discover existing information, which is all any party is obliged to furnish under well-established rules of discovery pursuant to MCR 2.302(B). Subject to this objection and without waiver thereof, the Company would answer as follows: The Company has already submitted a wide range of gas prices in the IRP included in this CON filing. The EIA AEO 2017 forecast falls in between the DTE Reference Scenario and the DTE High Gas Scenario. Since CCGT was selected in both of these scenarios, it follows that CCGT would be selected in the EIA AEO 2017 forecast as well. Therefore, running a scenario consistent with EIA AEO 2017 projections would be redundant and provide no additional information of any value to what DTE Electric has already submitted in this CON filing. Regarding whether the Company would be willing to run a scenario as described in question STDE-15.1, i.e. (2% EWR + 5.8% DR + 20% Renewables + EIA gas prices with a high gas sensitivity), the Company is not willing to run any additional scenarios, as we ran a wide range of scenarios and sensitivities in preparing for our IRP, covering the broad range of expected and unknown parameters. Our analysis, combined with our planning principles, and risk analysis led us conclusively to the IRP in which we selected the nominal 1100MW combined cycle plant that is the subject of this CON filing.

See also the Company's response to STDE-15.1(a-c).

MPSC Case No.: U-18419
Respondent: I. M. Dimitry
Requestor: STAFF
Question No.: STDE-2.29d
Page: 1 of 1

Question: Please reference Irene Dimitry's testimony on page 25-31 regarding PPA's and RFP's, please provide a summary of the responses the Company received regarding the March 1, 2017 RFP.

d. If so, was any specific criteria identified as prohibiting the respondent from submitting a bid?

Answer: Yes. In their letter to the Company, MCV stated, "… the RFP places express unwarranted bidding limitations on independent power suppliers like MCV that prevent it from presenting a commercially viable Power Purchase Agreement (PPA) option in the case where new generation capacity is the preferred option or need. Specifically, the RFP limits the Delivery Term for PPAs to 7 years, whereas the useful life of a new electric generating asset is upwards of 30 years, therefore unfairly restricting the IPP from commercially favorable financing mechanisms. Other unreasonable and onerous bid requirements as part of the PPA Key Commercial Term Sheet in the RFP presents unfair obstacles for IPPs to present an equivalent competitive alternative."

It is clear that MCV feels the 7-year PPA term length limit prohibited them from submitting a bid. In addition, they did not elaborate on the other "unreasonable and onerous bid requirements" mentioned in their letter.

S T A T E OF M I C H I G A N

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

*** * * ***

In the matter of the application of DTE ELECTRIC COMPANY approval of Certificate of Necessity pursuant to MCL 460.6s, as amended, in connection with the addition of a natural gas combined cycle generating facility to its fleet and for related accounting and ratemaking authorizations.	**)**	**Case No. U-18419**

QUALIFICATIONS AND DIRECT TESTIMONY OF

OLUMIDE O. MAKINDE

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

QUALIFICATIONS OF OLUMIDE O. MAKINDE
CASE NUMBER U-18419
PART I

Q. Please state your name and business address.

A. My name is Olumide O. Makinde. My business address is 7109 West Saginaw Highway, Lansing, MI 48917.

Q. By whom are you employed and in what capacity?

A. I am employed by the Michigan Public Service Commission (MPSC or the Commission) in the Resource Adequacy and Retail Choice section of the Financial Analysis and Audit Division as an Economic Analyst.

Previous to this position, I was employed in the Rates and Tariffs section of the Regulated Energy Division of the MPSC as a Departmental Analyst.,.

Q. Would you briefly describe your academic background?

A. I received a Bachelor of Arts in Economics from Michigan State University in 2011, and a Masters of Arts in Applied Economics, concentrating in Econometrics and Economic Development, at Western Michigan University in 2015.

I completed the Annual National Association of Regulatory Utility Commissioners (NARUC) Regulatory Studies program, Institute of Public Utilities Advanced Regulatory Studies Program at MSU and Institute of Public Utilities (IPU) Grid School, in August 2015, October 2016, and March 2017, respectively.

In addition, I have attended the Resource and Portfolio Planning conference sponsored by Electric Utility Consultants, Inc. (August 2017). And EGEAS modelling training sessions conducted by Midcontinent Independent System Operator (MISO) (2016, 2017).

QUALIFICATIONS OF OLUMIDE O. MAKINDE
CASE NUMBER U-18419
PART I

Q. Would you please outline your professional experience?

A. In February of 2014 I accepted a position as a Departmental Analyst, where my responsibilities included the following: preparing monthly bill comparisons for regulated gas and electric utilities and cooperatives for posting to the MPSC website, assisting other MPSC Staff (Staff) with various assignments and case work, preparing case schedules and related materials for the benefit of Staff, researching various proposals before the Commission involving rates and tariffs, and examining tariff sheets submitted by regulated utilities and cooperatives for compliance with Commission orders. I also conduct statistical and economic analyses on past and present financial, load, and rate data. In addition, I research, study, and conduct analyses on production/cost functions and models in relation to utilities that are under the Commission`s regulatory authority.

Q. What are your current responsibilities at the MPSC?

A. My work focuses on generation resource adequacy, load forecasting, and integrated resource planning (IRP) including long-term capacity expansion, zonal and nodal, modeling and analysis. In 2017, I assisted with the development and drafting of the IRP filing requirements, in accordance with the new energy legislation 2016 Public Act 341 (Act 341), MCL 460.6t.

Additionally, since joining the Commission Staff, I have been active in various resource adequacy and generation planning activities.

Q. Have you worked on any cases for the MPSC?

A. Yes, I have worked on the following cases:

Case No.	Utility	Subject

U-17316-R	Thumb Electric Co-Op	TIER Rates
U-17825	Consumers Energy Company (Electric)	Residual Balance Refund
U-17880	Michigan Gas Utilities Corp	Special Charges
U-17999	Detroit Edison Gas	Miscellaneous Revenue
U-18124	Consumers Energy Gas Company	Rate Design

Q. Have you previously testified before the Commission?

A. Yes, I provided testimony on the listed issues/topics in following case:

1) U-17999 - adjustments to, projected operating revenue, miscellaneous service revenue calculation, blight removal requests 2010-2014, and residential rate design.

2) U-18124 - adjustments to projected sales revenue, present and proposed revenue by rate schedule, present and proposed rates by rate schedule, allocation of residential income assistance (RIA) credit, comparison of present and proposed monthly bills, discount and carrying cost rates, rate design, and low-income assistance program.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present the Michigan Public Service Commission Staff's (Staff) position regarding: DTE Electric Company's (DTE or Company) long-term forecast of the electric utility's load growth under various reasonable scenarios and the projected fuel costs under various reasonable scenarios for the proposed generation (included in MCL 460.6s(11)(b)). Additionally, my testimony will present Staff`s position on the modeling of the natural gas price forecasts (as an input) by the Company and included in its integrated resource plan (IRP). I am also testifying on various topics dealing with the modeling involved in the IRP, in the matter of Detroit Edison Electric`s (DTE or the Company) application for a certificate of necessity pursuant to 2016 Public Act 341 (Act 341).

Q. What specific guidance was available to Staff in its review of DTE's application for a certificate of necessity relating to the proposal to build the 1150 MW[1] natural gas-fired electric generation facility?

A. Staff relied upon Act 341, specifically MCL 460.6s and the Commission's May 11, 2017 Order in Case No. U-15896. Staff also reviewed the Company`s application, prefilled direct testimony, exhibits, and workpapers.

Q. What specific elements of DTE's application will be addressed by your testimony?

[1] Prefiled Direct Testimony and Exhibits of Kevin J. Chreston, p 63.

My testimony addresses the load and natural gas price forecasts, the application filing requirements outlined in MCL 460.6s(11)(a), and Attachment B of the December 23rd Order in Case No. U-15896. My testimony includes an assessment of the Company`s Integrated Resource Planning (IRP) process, focusing on the models and methods employed, including how supply and demand side resources were input into the various models for selection, as well as the company's risk analysis.

Q. Are you sponsoring any exhibits?

A. Yes.

Exhibit S-2.1: 2016-2040 EIA Load Forecast (North East Central Region).

Exhibit S-2.2: 2016-2040 Load Forecast: Annual Growth Comparison

Exhibit S-2.3: Long-Term Natural Gas Price Forecast.

Exhibit S-2.4: Company's Monthly Long-Term Natural Gas Price Forecasts Under Various Scenarios.

Exhibit S-2.5: Discovery Response from Company.

Exhibit S-2.6: EIA Energy Outlook: Cases/Scenarios, Descriptions/Assumptions and Other Information.

Exhibit S-2.7: Portfolio Expected Value and Economic Risk Comparison.

Q. Please describe the various scenarios and sensitivities analyzed in the IRP.

A. The Company developed the following five scenarios for the IRP: 1) A reference case: This scenario assumes that abundant low-cost supplies keep natural gas prices low, electricity market prices remain relatively low and there are significant

coal retirements due to favorable economics and pressure from continued environmental regulation of new gas units over older coal units. 2) High Gas Prices: Higher natural gas marginal production costs come about from higher demand, increased exports, increased costs put on fracking operations by an increase in gas industry regulations or a combination of the three. The higher gas prices lead to more renewables and natural gas to meet CPP goals or similar constraints. 3) Low Gas Prices: Low cost natural gas supplies and continued productivity improvements keep gas prices low, driving more coal and some nuclear. It includes a retirement due to lower power prices and reduced coal plant dispatch. 4) Emerging Technology: Decreasing costs and higher efficiencies for renewables (especially solar) and storage across the country lead to higher renewable penetration and lower CO2 emissions, which would comply with the Clean Power Plan or similar constraints. CO2 prices are zero in this scenario. Electricity Market prices are also lower in this scenario due to the abundance of zero dispatch cost renewable technologies. 5) Aggressive CO2: This scenario assumes that the Clean Power Plan is tightened post-2030 to keep the US on a trajectory to meet an 80% reduction by 2050, which is in alignment with the Paris Accord. It assumes that new sources are included under the CO2 emissions cap, and that emissions continue to decline as coal is phased out in favor of renewables and gas technologies.

MCL 460.6s(11)(a)

Q. Did the Company's July 2017 Integrated Resource Plan (IRP) included with the application for a natural gas combined cycle generating facility and associated certificate of need contain "(a) long-term forecast of the electric utility's load growth under various reasonable scenarios", as outlined in section 6s(11), subsection (a) of Act 341?

A. Yes. Company witness Chreston supplied a long-term forecast of peak demand and energy requirements, and provided a brief overview of the methodology utilized to arrive at the forecasting results.[2] These can be found on pages 48 through 62 of the IRP report, Exhibit A-4.Additionally, Company witness Markus B. Leuker provided testimony supporting the Company's electric sales and demand assumptions, forecasting methodology, and other key assumptions supporting the scenarios described in the Company's IRP report.

Q. Please describe the growth rates pertaining to electric sales and system peak demand as presented by the Company.

A. Mr. Leuker stated on page 7 of his direct testimony, that, "(s)ervice area sales are expected to decrease to 46,374 GWh in 2040 (46,962 GWh in 2015) in the reference scenario," representing a negative 0.1% compound annual growth rate (CAGR). Mr. Leuker also provided long term annual service area sales and peak demand forecasts for the "Reference" and "2017 Reference" scenarios as well as High Load and Low Load sensitivities.[3]

[2] Prefiled Direct Testimony and Exhibits of Kevin J. Chreston, pp 48-62.
[3] Prefiled Direct Testimony and Exhibits of Markus B. Leuker, Exhibit A-17.

Q. Are the growth rates proposed by the Company consistent with other load growth projections in the region?

A. Yes. Staff compared the Company's long-term energy sales forecast against the long-term "Energy Use Delivered All Sectors Total"[4] forecast for the "East North Central" region produced by the Energy Information Agency (EIA). The EIA is projecting a decline of 0.6 % CAGR for the 2016 to 2040 period in its 2017 Annual Energy outlook (2016 Reference case)[1] East North Central, a/k/a Midwest, regional long-term total electric sales forecast. See Exhibit S-2.1.

Q. Did the Company supply a detailed economic outlook, used to develop its load forecast?

A. Yes. This can be found in Mr. Leuker's Exhibit A-18. The Company also described the business climate for its service territory[5] and economic outlook for Southeast Michigan.[6]

Q. Did the Company project load growth expectations under, "…various reasonable Scenarios," as dictated by MCL 460.6s (11) subsection (a)?

A. Yes. Mr. Leuker provided the load forecast under the "Reference" and "2017 Reference" scenarios, and under the High and low load sensitivities in Company Exhibit A-17.

Q. What is the difference between the "Reference" and "2017 Reference" scenarios?

A. Mr. Leuker detailed the differences between the two, stating "In the 2017 Reference Scenario, a revised and expanded Energy Optimization (EO) plan shifts

[4] See Exhibit S-2.6 for details, definitions and assumptions
[5] Prefiled Direct Testimony and Exhibits of Markus B. Leuker, p 8.
[6] *Id.*, p 9.

focus from residential market programs to a higher concentration on commercial and industrial opportunities" amongst other revisions of the "Reference" case assumptions.[7]

Q. What is Staff's conclusion regarding the Company's projected load growth expectations?

A. In Staff's opinion, the Company`s projected load growth expectations in the various scenarios are appropriate. When compared side by side, the Company`s forecast in Exhibit A-17 and that of the EIA[8], Staff found that the CAGRs for the Company and the EIA, are within a reasonable range of each other in all the cases. The analysis can be found in Exhibit S-2.2. The range of load growth expectations from a low load-growth sensitivity of negative 0.7% to a high-load growth sensitivity of 0.5% are within an acceptable range given current conditions.[9]

MCL 460.6s(11)(b): Projected Fuel.

Q. Did the Company include the projected fuel costs under various reasonable scenarios for the proposed generation included in MCL 460.6s(11)(b) in the IRP?

A. Yes. Short-term 2017 to 2022 and 2016 to 2021 annual fuel forecasts, including all other fossil fuels, for the reference scenario were provided by the Company. These forecasts can be found in Company witness David Swiech's Exhibit A-29 and A-28, respectively. Monthly and annual long-term natural gas forecasts

[7] Prefiled Direct Testimony and Exhibits of Markus B. Leuker, p 20.

[8] EIA 2017 Energy Outlook.

[9] Prefiled Direct Testimony and Exhibits of David Swiech, p 20.

under the various reasonable scenarios were provided by the Company in various workpapers. These forecasts are compiled in Staff Exhibit S-2.3 and S-2.4.

Q. What are the Company's sources and/or methods used for the long-term natural gas price forecasts employed to create the composite forecast for purposes of the IRP?

A. The Company employed two methods in determining the natural gas price forecast of the segments of the study period. For the periods from 2016 to 2021, Company witness Swiech, in his direct testimony, stated "the natural gas price forecast was developed using the same methodology the Company uses for delivered price forecasts in annual PSCR filings".

For the remaining years of the study period, Company witness Kevin J. Chreston stated, "For the Reference case, we used the forward fuel prices through 2021. To determine the natural gas prices for the Reference case, we compared the gas forwards to the fundamental gas price forecast, both at Henry Hub. Then, we determined the number of transition years to make a smooth changeover in concert with a similar evaluation of the energy prices."[10] . A one-year transition in 2022 was employed to smooth between the forward fuel prices and the fundamental forecast in 2023.[11]

Q. Is the Company's long term natural gas price forecast (under the various reasonable scenarios) consistent with those of other industry projections?

[10] Prefiled Direct Testimony and Exhibits of Kevin J. Chreston, p 33.
[11] *Id p33.*

A. Yes, the Company's long term natural gas price projections are consistent with those of other industry projections for the "Reference" and "Low Natural Gas Price" scenarios/sensitivities. The Company's "High Natural Gas Price" scenario is not consistent.

Q. How did Staff determine the consistencies and inconsistencies outlined above?

A. Staff used data from the EIA[12] for long term natural gas prices, using the Henry Hub as a price index. Staff selected the EIA "reference case", "Low oil and gas resource and technology" (high natural gas price), and "High oil and gas resource and technology" (low natural gas price) scenarios[13].

Q. Did the Company provide possible reasons for the inconsistency?

A. Yes. In response to Staff discovery, the Company stated, "They are separate forecasts and used different assumptions".[14]

Q. If the Company's high natural gas price sensitivity is a separate forecast and used different assumptions from the EIA's low oil and gas resource and technology case, why does Staff compare the two?

A. Staff compared the Company`s projections/forecasts to those of the 2017 EIA Energy Outlook because it is publicly available at no cost and contains a variety of scenarios. EIA "Energy Outlook" data has also been used previously by Staff and other regulated utilities in various Certificate of Need applications,[15] and

[12] https://www.eia.gov/outlooks/aeo/data, retrieved,11/22/2017.
[13] Exhibit S-2.6
[14] Exhibit S-2.5
[15] Case No. U-18224 and U-17429.

other applications.[16] The differences in assumptions reflected in Exhibit S-2.5 page 2 of 2.

Staff utilized the following methodologies:

1) Compared the CAGR in projected/forecasted natural gas prices under the various scenarios/sensitivities; 2) calculated the difference between the Company`s and EIA's low and high gas price, from the reference cases, to determine the appropriateness of the high and low cases.

Q. How did Staff determine that the methodology applied was appropriate?

A. Staff determined method one to be appropriate, as the magnitude of the CAGR would indicate the severity of the increase or decrease in prices over the study period. Staff found method two to be appropriate as it was essentially a simplified Chi-Square Test for Variance, measuring the standard deviation of the two samples (high gas and low gas) from the mean (reference scenario).

Q. What is a Chi-Square Test?

A. According to Snedecor and Cochran, "a chi-square test can be used to test if the variance of a population is equal to a specified value."[17] This test can be either a two-sided test or a one-sided test. The two-sided version tests against the alternative that the true variance is either less than or greater than the specified value. The one-sided version only tests in one direction. The choice of a two-sided or one-sided test is determined by the problem. For example, if we are

[16] Case No. U-18461, Michigan Capacity Resource Assessment.
[17] Snedecor, George W. and Cochran, William G. (1989), *Statistical Methods*, Eighth Edition, Iowa State University Press.

testing a new process, we may only be concerned if its variability is greater than the variability of the current process[18].

Q. How did Staff determine that the accuracy of the inconsistency found in the high gas sensitivity?

A. The accuracy of method one was confirmed by the resulting difference between the Company`s and EIA`s "reference" and "low gas" scenarios/sensitivities. The CAGR are within 0.003% of each other. The accuracy of method two was confirmed by simpler results in the deviation of the low gas sensitivities to the references cases. The Company's and EIA's deviations are within 0.001% percent of each other for the low gas and reference comparison.

Q. What were the results of this comparison/analysis?

A. The results can be found in Exhibit S-2.3 pages 1 to 3. For the reference case, the Company's and the CAGR in natural gas prices are 4.5% and 4.9%, respectively. Regarding the high gas price sensitivity, the Company's natural gas price CAGR (2017 to 2035) is 7.7%, however, EIA is projecting a 9.3% natural gas price CAGR in its "low oil and gas resource and technology" (high gas price) scenario. Regarding the Low gas price sensitivity, the Company's natural gas price CAGR is 3.5%, which is in line with the EIA projecting a 3.7% natural gas price CAGR in its "high oil and gas resource and technology" (low gas price) scenario. The CAGR of the Company`s and EIA`s projections for the reference and low cases

[18] *NIST/SEMATECH e-Handbook of Statistical Methods*, http://www.itl.nist.gov/div898/handbook/eda/section3/eda358/, 11/22/2017.

are within 0.3% of each other, while the company's high gas case CAGR is 3.9% lower.

Q. What impact does the inconsistency of the Company`s high gas case projection have on the IRP modeling process and/or results?

A. In Staff's opinion, if the Company has not adequately modeled a high gas price sensitivity, it's possible that the Company is underestimating the net present value of revenue requirements in the event that gas prices rise closer to the EIA's high gas price scenario compared to the Company's forecasts. Said another way, if the gas prices exceed the prices projected in the Company's high gas price sensitivity, it's possible that the Company's proposed natural gas-fired combined cycle generation facility may not be the most reasonable and prudent option to meet the Company's future needs.

Modeling

Q. What is Staff's conclusion regarding the Company's long-term natural gas price forecasts, used in its IRP model?

A. In Staff's opinion, the Company`s natural gas price forecasts are appropriate except for the above mentioned "high gas" sensitivity. The Company should have modeled a higher natural gas price forecast in the "high gas" sensitivity to more fully capture the risk associated with the potential for higher gas prices in the future.

Q. Does Staff have any recommendations regarding further modeling with a higher gas price?

A. Yes. Staff recommends that the Company be directed to update its high gas price sensitivity with a higher gas price forecast that would be consistent with the Commission's recently approved Michigan Integrated Resource Planning Parameters (MIRPP) in Case No. U-18461, as specified for the high gas price sensitivity in the Business as Usual Scenario. The MIRPP specifies a high gas price sensitivity to "(i)ncrease the natural gas fuel price projections from the base projections to at least 200% of the business as usual natural gas fuel price projections at the end of the study period." The MIRPP also notes that 200% of the most recent EIA Annual Energy Outlook reference case natural gas price would be $10.14/MMBtu ($2016) in 2040. Using this guidance, Staff developed three annual prices expressed in Exhibit S-2.3, page 4 of 4 columns (a), (b) and (c). Staff recommends that the Company be directed to update its high gas price sensitivity in a manner consistent with the MIRPP high natural gas price sensitivity and post the results in an amended exhibit in the docket.

Q. How were the three high gas annual natural gas price forecasts developed?

A. Given that the high gas scenario specified in the MIRPP did not give explicit direction on how the 200% increased gas price forecast should be developed. Staff developed the following potential high gas price forecasts for illustration:

1) In column (a) of Exhibit S-2.3, page 4 of 4, Staff distributed the 200% price increase evenly over the study period (2017 to 2040), to come up with an annual growth rate in natural gas prices. In column (b) of Exhibit S-2.3, Staff multiplied the Company`s "reference" natural gas price forecast for each year by the growth rate developed in column (a).

2) Column (c) of Exhibit S-2.3, prices were developed by employing a similar method used by the Company by including a transition period between the short-term and long-term forecasts. For the 2016 to 2022 period, Staff used the Company`s short-term forecast, and then the EIA CAGR of 9.3% (line 26 of Exhibit S-2.3 page 2 of 4, column (d)) was applied to the 2022 price onwards.

3) Column (d) of Exhibit S-2.3 used the same method as step 1, except the MIRPP 200% growth rate in column (a) is multiplied by the EIA "reference" case natural gas price projections.

Q. Are there any issues Staff would like to address, relative to the resource screen developed by the utility in the IRP modeling?

A. Though the Company looked at a multitude of resource options, it is in Staff`s opinion that the company did not develop an optimal resource screening curve. This opinion is due to the following:

1. Demand Response and Energy Waste Reduction programs were not evaluated in a way that the model could select those resources on an economic basis.

2. The loading blocks (sizes of the generic resources) for the various resources were not modeled on an "equitable" basis.

Staff's position is addressed further by Staff witness Simpson.

Q. Did the Company perform any form of risk analysis in the 2017 IRP accompanying the Certificate of Necessity application?

A. Yes, the Company performed two variants of risk analysis (discussed by witness Simpson), in addition to the scenarios and sensitivity analysis. The Company's

2017 IRP included both an Analytic Hierarchy Process (AHP) and a Stochastic analysis.

Q. Are the forms of risk analysis utilized by the Company appropriate for IRP purposes and were the methodologies properly applied?

A. Yes, in Staff's opinion, the four forms of risk analysis were appropriate. However, the Company`s scenario and sensitivity analysis are not robust enough, in determining exposure to risk of a portfolio plan.

Q. What is Staff`s position on the risk analysis and modeling?

A. Staff has identified the following concerns on the reporting of the AHP and Stochastic analysis.

1. The Stochastic analysis was reported and applied as a comparison to alternate build plans rather than an evaluation of the risk exposure of the preferred plan.

2. Staff finds that the portfolios that were used to compare the Company's proposed course of action (AHP and Stochastic analysis) do not appear to have been evaluated elsewhere in the 2017 IRP.

Q. What is Staff`s concern on the reporting and application of the Stochastic analysis?

A. As stated by Staff witness Simpson, it is Staff's opinion that the Company ran stochastic analysis on significantly different plans; however, the plans selected were not optimized, and were not the near optimized build plans (alternative plans) for any scenario in the Company's IRP. The Company states that the selection of alternative build plans in its risk analyses, "were selected as they

represented significantly different build plans, to the preferred plan."[19] Staff believes the stochastic analysis did not completely fit the purpose of this type of risk analysis. Expanding on witness Simpson's position that the purpose of a stochastic risk assessment as being two-fold, 1) a stochastic risk assessment can be used to determine the specific uncertainties and the probability distribution of those uncertainties, to which a build plan is at risk to,2) a stochastic risk assessment can provide a monetized measure the impact of a future where uncertain variables and their interplay, have very different outcomes than expected.

Stochastic risk assessment measures the possible impact selected uncertainties can have on an optimal build plan when, exposed to variances in the specified uncertainties- such as increases or decreases in load over a period of time and/or intervals of time- when build plans cannot be reversed.

Understanding risk and the associated monetized impact helps to determine if the least cost plan is truly the best plan, when coupled with the selected uncertainties, associated probabilities, and their interplay. This understanding gives decision makers the ability to alter plans by reducing and/or minimizing exposure to the risk variables in the future. Allowing for small alterations that do not drastically deviate from the optimized plan may ultimately limit the ratepayer's exposure to risk inherent with that plan.

[19] Exhibit A-4 , p214.

Q. Does Staff believe the portfolios that were used in the Company's risk analysis should have been more fully evaluated in the Company's IRP?

A. Yes, Staff believes that the "Wind", "Solar", and "Demand Response" portfolios should have been evaluated fully in the Company's IRP, as the variance between the preferred plans "Expected Value" and "Economic Risk," on average, are under $500,000 and under $340,000, respectively from the other options. These differences are miniscule over the study period (2017 to 2040). See exhibit S-2.7

Q. Does this conclude your testimony?

A. Yes.

S T A T E O F M I C H I G A N

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

*** * * ***

In the matter of the application of DTE ELECTRIC COMPANY approval of Certificate of Necessity pursuant to MCL 460.6s, as amended, in connection with the addition of a natural gas combined cycle generating facility to its fleet and for related accounting and ratemaking authorizations.	**)**	**Case No. U-18419**

EXHIBITS OF

OLUMIDE O. MAKINDE

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

Michigan Public Service Commission
Staff
2016-2040 EIA Load Forecast (North East Central Region)

Case No.: U-18419
Exhibit S-2.1
Witness: Olumide O. Makinde

		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
		EIA 2016 Reference Case		EIA 2017 High Load Growth		EIA 2017 Low Load Growth		EIA 2017 Reference	
Line No.	Year	GWh	(Year on Year Growth)	GWh	(Year on Year Growth)	GWh	(Year on Year Growth)	GWh	(Year on Year Growth)
1	2015	4,543,560		4,346,172		4,346,162		4,346,174	
2	2016	4,439,962	-0.0228	4,366,766	0.0047	4,367,203	0.0048	4,366,844	0.0048
3	2017	4,439,033	-0.0002	4,384,703	0.0041	4,385,306	0.0041	4,401,920	0.0080
4	2018	4,435,346	-0.0008	4,382,689	-0.0005	4,356,527	-0.0066	4,368,093	-0.0077
5	2019	4,408,339	-0.0061	4,404,623	0.0050	4,350,988	-0.0013	4,373,021	0.0011
6	2020	4,361,989	-0.0105	4,363,704	-0.0093	4,298,115	-0.0122	4,337,751	-0.0081
7	2021	4,316,127	-0.0105	4,309,578	-0.0124	4,227,407	-0.0165	4,275,356	-0.0144
8	2022	4,265,778	-0.0117	4,223,632	-0.0199	4,132,215	-0.0225	4,188,439	-0.0203
9	2023	4,228,623	-0.0087	4,211,078	-0.0030	4,103,085	-0.0070	4,160,588	-0.0066
10	2024	4,194,611	-0.0080	4,189,563	-0.0051	4,059,179	-0.0107	4,142,142	-0.0044
11	2025	4,166,025	-0.0068	4,185,399	-0.0010	4,033,403	-0.0064	4,140,608	-0.0004
12	2026	4,139,473	-0.0064	4,177,994	-0.0018	4,002,933	-0.0076	4,107,650	-0.0080
13	2027	4,114,613	-0.0060	4,155,402	-0.0054	3,961,078	-0.0105	4,078,301	-0.0071
14	2028	4,084,358	-0.0074	4,112,892	-0.0102	3,931,571	-0.0074	4,058,181	-0.0049
15	2029	4,053,144	-0.0076	4,084,760	-0.0068	3,884,534	-0.0120	4,023,315	-0.0086
16	2030	4,020,562	-0.0080	4,065,853	-0.0046	3,857,358	-0.0070	3,998,725	-0.0061
17	2031	4,001,045	-0.0049	4,052,496	-0.0033	3,833,195	-0.0063	4,007,785	0.0023
18	2032	3,988,393	-0.0032	4,039,046	-0.0033	3,805,594	-0.0072	3,997,170	-0.0026
19	2033	3,975,382	-0.0033	4,044,323	0.0013	3,786,355	-0.0051	3,988,520	-0.0022
20	2034	3,963,902	-0.0029	4,066,494	0.0055	3,757,452	-0.0076	3,989,847	0.0003

Quad: a unit of energy equal to 1015 (a short-scale quadrillion) BTU,[1] or 1.055 × 1018 joules (1.055 exajoules or EJ) in SI units.

1 Quad = 293071.08333333 Gwh

Source: EIA 2017 Energy Outlook

Michigan Public Service Commission
Staff
2016-2040 EIA Load Forecast (North East Central Region)

Case No.: U-18419
Exhibit S-2.1
Witness: Olumide O. Makinde

		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
		EIA 2016 Reference Case		EIA 2017 High Load Growth		EIA 2017 Low Load Growth		EIA 2017 Reference	
Line No.	Year	GWh	(Year on Year Growth)	GWh	(Year on Year Growth)	GWh	(Year on Year Growth)	GWh	(Year on Year Growth)
1	2035	3,954,286	-0.0024	4,051,101	-0.0038	3,736,890	-0.0055	3,985,320	-0.0011
2	2036	3,941,597	-0.0032	4,070,112	0.0047	3,713,366	-0.0063	3,989,058	0.0009
3	2037	3,936,805	-0.0012	4,092,048	0.0054	3,717,574	0.0011	4,007,813	0.0047
4	2038	3,928,734	-0.0021	4,119,433	0.0067	3,707,662	-0.0027	4,003,764	-0.0010
5	2039	3,917,005	-0.0030	4,147,906	0.0069	3,702,861	-0.0013	4,007,840	0.0010
6	2040	3,935,015	0.0046	4,185,057	0.0090	3,684,702	-0.0049	4,015,565	0.0019
7	**Total Load 2015-2040**	**23,613,442**		**24,665,657**		**22,263,056**		**24,009,360**	
8	**Average Annual Load**	**3,935,574**		**4,110,943**		**3,710,509**		**4,001,560**	
9	**CAGR**		**-0.1%**		**0.5%**		**-0.3%**		**0.1%**

Quad: a unit of energy equal to 1015 (a short-scale quadrillion) BTU,[1] or 1.055 × 1018 joules (1.055 exajoules or EJ) in SI units.
1 Quad = 293071.08333333 Gwh
Source: EIA 2017 Energy Outlook

Michigan Public Service Commission
Staff
2016-2040 Load Forecast: Annual Growth Comparison

Case No.: U-18419
Exhibit S-2.2
Witness: Olumide O. Makinde
Page: 1 of 1

Line No.	Year	(a) REFERENCE SCENARIO DTE Sales	(b) REFERENCE SCENARIO EIA Delivered Energy	(c) HIGH LOAD SENSITIVITY DTE Sales	(d) HIGH LOAD SENSITIVITY EIA Delivered Energy	(e) LOW LOAD SENSITIVITY DTE Sales	(f) LOW LOAD SENSITIVITY EIA Delivered Energy	(g) 2017 REFERENCE DTE Sales	(h) 2017 REFERENCE EIA Delivered Energy
		%		%		%		%	
1	2016		-0.0228		0.0047		0.0048		0.0048
2	2017	-0.0139	-0.0002	-0.0072	0.0041	-0.0257	0.0041	-0.0017	0.0080
3	2018	0.0089	-0.0008	0.0125	-0.0005	-0.0021	-0.0066	-0.0055	-0.0077
4	2019	0.0010	-0.0061	0.0046	0.0050	-0.0056	-0.0013	-0.0002	0.0011
5	2020	-0.0015	-0.0105	0.0018	-0.0093	-0.0089	-0.0122	-0.0036	-0.0081
6	2021	-0.0026	-0.0105	0.0014	-0.0124	-0.0086	-0.0165	0.0014	-0.0144
7	2022	-0.0021	-0.0117	0.0012	-0.0199	-0.0080	-0.0225	-0.0006	-0.0203
8	2023	-0.0014	-0.0087	0.0022	-0.0030	-0.0073	-0.0070	0.0009	-0.0066
9	2024	-0.0004	-0.0080	0.0033	-0.0051	-0.0064	-0.0107	0.0016	-0.0044
10	2025	0.0005	-0.0068	0.0038	-0.0010	-0.0055	-0.0064	-0.0004	-0.0004
11	2026	0.0020	-0.0064	0.0039	-0.0018	-0.0041	-0.0076	-0.0002	-0.0080
12	2027	-0.0001	-0.0060	0.0023	-0.0054	-0.0056	-0.0105	-0.0002	-0.0071
13	2028	-0.0001	-0.0074	0.0024	-0.0102	-0.0056	-0.0074	0.0011	-0.0049
14	2029	-0.0003	-0.0076	0.0024	-0.0068	-0.0057	-0.0120	-0.0007	-0.0086
15	2030	-0.0004	-0.0080	0.0025	-0.0046	-0.0058	-0.0070	-0.0003	-0.0061
16	2031	-0.0006	-0.0049	0.0027	-0.0033	-0.0059	-0.0063	0.0001	0.0023
17	2032	-0.0007	-0.0032	0.0030	-0.0033	-0.0060	-0.0072	0.0006	-0.0026
18	2033	-0.0009	-0.0033	0.0034	0.0013	-0.0061	-0.0051	-0.0014	-0.0022
19	2034	-0.0001	-0.0029	0.0047	0.0055	-0.0052	-0.0076	-0.0007	0.0003
20	2035	-0.0003	-0.0024	0.0054	-0.0038	-0.0054	-0.0055	-0.0009	-0.0011
21	2036	-0.0006	-0.0032	0.0063	0.0047	-0.0056	-0.0063	-0.0004	0.0009
22	2037	-0.0007	-0.0012	0.0077	0.0054	-0.0058	0.0011	-0.0016	0.0047
23	2038	-0.0009	-0.0021	0.0096	0.0067	-0.0059	-0.0027	-0.0014	-0.0010
24	2039	-0.0009	-0.0030	0.0124	0.0069	-0.0059	-0.0013	-0.0014	0.0010
25	2040	-0.0009	0.0046	0.0161	0.0090	-0.0059	-0.0049	-0.0004	0.0019
26	**CAGR**	-0.1%	-0.6%	0.5%	-0.1%	-0.7%	-0.7%	-0.1%	-0.3%

Source: EIA 2017 Energy Outlook

MICHIGAN PUBLIC SERVICE COMMISSION
Staff
Long-Term Natural GasPrice Forecasts

Case No.: U-18419
Exhibit S-2.3
Witness: Olumide O. Makinde

		(a)	(b)	(c)	(d)	(e)	(f)
		Henry Hub ($/Mmbtu)					
Line No.	Year	Reference [1]	EIA 2016 Reference [4]	High Gas [2]	EIA High Gas [5]	Low Gas [3]	EIA Low Gas [6]
1	2016	2.43	2.62	2.43	2.55	2.35	2.42
2	2017	2.97	2.63	2.97	3.24	2.70	2.83
3	2018	2.99	3.21	2.99	3.83	2.87	3.24
4	2019	3.01	3.83	3.01	4.71	3.02	3.75
5	2020	3.11	4.34	3.11	5.90	3.28	3.86
6	2021	3.26	4.90	3.26	6.44	3.31	3.62
7	2022	3.63	4.89	4.55	7.24	3.37	3.56
8	2023	4.00	5.03	5.83	7.74	3.44	3.71
9	2024	4.16	5.59	6.09	8.19	3.59	3.94
10	2025	4.37	6.00	6.42	8.76	3.64	4.14
11	2026	4.67	6.27	6.72	9.41	3.77	4.37
12	2027	4.94	6.22	6.96	9.86	3.86	4.63
13	2028	5.18	6.31	7.24	10.30	3.96	4.96
14	2029	5.46	6.50	7.64	10.72	4.06	5.08
15	2030	5.65	6.69	7.89	11.02	4.15	5.03
16	2031	5.86	6.84	8.11	11.89	4.26	4.89
17	2032	5.98	6.93	8.33	12.45	4.37	4.90
18	2033	6.10	7.11	8.58	12.71	4.50	4.97
19	2034	6.17	7.19	8.73	12.96	4.59	5.07
20	2035	6.24	7.32	9.16	13.24	4.71	5.15
21	2036	6.38	7.42		14.06	4.82	5.21
22	2037	6.52	7.56		14.76	4.92	5.27
23	2038	6.66	7.63		15.45	5.03	5.40
24	2039	6.81	7.70		16.04	5.14	5.53
25	2040	6.96	7.98		16.50	5.25	5.56
26	Average Annual Price	4.94	5.95	6.00	10.00	3.96	4.44

Notes

1. **KJC-35 "Forwards Vs Pace 1 Yr trans", Column L.**
2. **KJC-229, "Blended Gas Forecast", column O.**
3. **KJC-275, "Blended Gas Forecast", Column L.**
4. **U.S. Energy Information Administration: AEO2016 Reference case nom $/MMBtu**
5. **U.S. Energy Information Administration: Low oil and gas resource and technology nom $/MMBtu**
6. **U.S. Energy Information Administration: High oil and gas resource and technology nom $/MMBtu**

MICHIGAN PUBLIC SERVICE COMMISSION
Staff
Long-term Natural Gas Price Forecasts
Annual Percentage Change

Case No.: U-18419
Exhibit S-2.3
Witness: Olumide O. Makinde

		(a)	(b)	(c)	(d)	(e)	(f)
		Henry Hub (Year on Year percentage Change in price)					
			EIA 2016		EIA High	Low Gas	EIA Low
Line No.	Year	Reference [1]	Reference [4]	High Gas [2]	Gas [5]	[3]	Gas [6]
1	2016						
2	2017	22.26%	0.38%	22.26%	26.81%	15.14%	16.85%
3	2018	0.75%	22.03%	0.75%	18.33%	6.23%	14.61%
4	2019	0.50%	19.38%	0.50%	22.85%	5.20%	15.74%
5	2020	3.47%	13.19%	3.47%	25.25%	8.69%	2.93%
6	2021	4.78%	12.88%	4.78%	9.26%	1.00%	-6.28%
7	2022	11.37%	-0.09%	39.52%	12.37%	1.74%	-1.69%
8	2023	10.21%	2.78%	28.33%	6.93%	2.23%	4.45%
9	2024	4.10%	11.16%	4.43%	5.83%	4.13%	6.21%
10	2025	4.87%	7.32%	5.37%	6.91%	1.46%	4.91%
11	2026	7.04%	4.49%	4.69%	7.44%	3.51%	5.71%
12	2027	5.63%	-0.74%	3.65%	4.76%	2.51%	5.82%
13	2028	4.91%	1.30%	3.95%	4.47%	2.42%	7.09%
14	2029	5.39%	3.02%	5.59%	4.06%	2.64%	2.46%
15	2030	3.57%	3.07%	3.15%	2.88%	2.23%	-1.02%
16	2031	3.64%	2.17%	2.84%	7.87%	2.55%	-2.65%
17	2032	2.10%	1.27%	2.67%	4.71%	2.72%	0.11%
18	2033	2.00%	2.71%	2.99%	2.10%	2.90%	1.33%
19	2034	1.12%	1.04%	1.84%	1.98%	1.94%	2.01%
20	2035	1%	2%	5%	2%	3%	2%
21	2036	2.20%	1.39%		6.17%	2.20%	1.25%
22	2037	2.20%	1.94%		5.00%	2.20%	1.11%
23	2038	2.20%	0.88%		4.68%	2.20%	2.38%
24	2039	2.20%	0.96%		3.77%	2.20%	2.50%
25	2040	2.20%	3.64%		2.88%	2.20%	0.61%
26	CAGR	4.6%	4.9%	7.7%	9.3%	3.5%	3.7%

Notes

1. **KJC-35 "Forwards Vs Pace 1 Yr trans", Column L.**
2. **KJC-229, "Blended Gas Forecast", column O.**
3. **KJC-275, "Blended Gas Forecast", Column L.**
4. **U.S. Energy Information Administration: AEO2016 Reference case nom $/MMBtu**
5. **U.S. Energy Information Administration: Low oil and gas resource and technology nom $/MMBtu**
6. **U.S. Energy Information Administration: High oil and gas resource and technology nom $/MMBtu**

MICHIGAN PUBLIC SERVICE COMMISSION
Staff
Long-term Natural Gas Price Forecasts
Annual Percentage Change

Case No.: U-18419
Exhibit S-2.3
Witness: Olumide O. Makinde
Page: 3 of 4

		(a)	(b)	(c)	(d)
		Henry Hub ($/Mmbtu)			
Line No.	Year	**High Gas [2] less Reference [1]**	**EIA High Gas [5] less EIA Reference [1]**	**Reference [1] less Low Gas [3]**	**Reference [1] Less EIA Low Gas [6]**
1	2016				
2	2017	0.00%	26.43%	7.12%	-16.47%
3	2018	0.00%	-3.70%	-5.47%	7.42%
4	2019	0.00%	3.47%	-4.70%	3.64%
5	2020	0.00%	12.06%	-5.22%	10.26%
6	2021	0.00%	-3.62%	3.78%	19.17%
7	2022	28.15%	12.46%	9.64%	1.60%
8	2023	18.12%	4.15%	7.98%	-1.67%
9	2024	0.33%	-5.33%	-0.03%	4.96%
10	2025	0.50%	-0.42%	3.41%	2.42%
11	2026	-2.36%	2.95%	3.53%	-1.23%
12	2027	-1.98%	5.50%	3.12%	-6.57%
13	2028	-0.95%	3.17%	2.49%	-5.78%
14	2029	0.20%	1.05%	2.75%	0.56%
15	2030	-0.42%	-0.20%	1.34%	4.09%
16	2031	-0.80%	5.70%	1.09%	4.82%
17	2032	0.57%	3.44%	-0.61%	1.16%
18	2033	0.99%	-0.60%	-0.90%	1.38%
19	2034	0.71%	0.94%	-0.81%	-0.97%
20	2035	3.70%	0.35%	-1.59%	0.15%
21	2036	-2.20%	4.78%	0.00%	0.14%
22	2037		3.06%	0.00%	0.83%
23	2038		3.80%	0.00%	-1.50%
24	2039		2.82%	0.00%	-1.55%
25	2040		-0.75%	0.00%	3.03%
26	Difference in CA	2.2%	3.4%	1.1%	1.2%

Notes

1. **KJC-35 "Forwards Vs Pace 1 Yr trans", Column L.**
2. **KJC-229, "Blended Gas Forecast", column O.**
3. **KJC-275, "Blended Gas Forecast", Column L.**
4. **U.S. Energy Information Administration: AEO2016 Reference case nom $/MMBtu**
5. **U.S. Energy Information Administration: Low oil and gas resource and technology nom $/MMBtu**
6. **U.S. Energy Information Administration: High oil and gas resource and technology nom**

MICHIGAN PUBLIC SERVICE COMMISSION
Staff
Long-term Natural Gas Price Forecasts
High Gas Case

Case No.: U-18419
Exhibit S-2.3
Witness: Olumide O. Makinde
Page: 4 of 4

Line No.	Year	(a) MIRPP 200% Growth rate [1]	(b) MIRPP multilied by Company`s ref prices [2]	(c) EIA CAGR to Refrence case from 2023 to 2036	(d) MIRPP multilied by EIA ref prices [3]
1	2016	1	2.427428571	2.43	2.621736
2	2017	1.04	3.09147327	2.97	2.7412335
3	2018	1.08	3.239307353	2.99	3.478924
4	2019	1.12	3.380752397	3.01	4.3129269
5	2020	1.17	3.62766708	3.11	5.0625713
6	2021	1.21	3.9366414	3.26	5.918889
7	2022	1.25	4.53551487	4.55	6.1175367
8	2023	1.29	5.165260733	4.96904354	6.496899
9	2024	1.33	5.550422242	5.43185717	7.4551045
10	2025	1.37	6.002466771	5.93777698	8.2509778
11	2026	1.42	6.61988605	6.49081784	8.8825849
12	2027	1.46	7.198322627	7.09536859	9.0760177
13	2028	1.50	7.767179274	7.75622681	9.4570151
14	2029	1.54	8.413330055	8.47863696	10.013075
15	2030	1.58	8.948935308	9.26833194	10.59942
16	2031	1.62	9.518511031	10.1315786	11.114249
17	2032	1.67	9.967703989	11.0752276	11.544386
18	2033	1.71	10.42103414	12.1067674	12.153275
19	2034	1.75	10.79508759	13.2343842	12.579068
20	2035	1.79	11.18144104	14.4670265	13.110821
21	2036	1.83	11.69316326	15.8144764	13.60199
22	2037	1.87	12.22198944	15.8176393	14.180819
23	2038	1.92	12.76842448	15.8208028	14.622979
24	2039	1.96	13.33298722	15.823967	15.083776
25	2040	2.00	13.9162108	15.8271318	15.964835

Notes

1. **cumulative 200% increase evenely distributed over 25 years.**
2. **colunm (a) multplied by page 1 colunm (a)**
3. **colunm (a) multplied by page 1 colunm (b)**

MICHIGAN PUBLIC SERVICE COMMISSION
Staff
Monthly Long-Term Natural GasPrice Forecasts

Case No.: U-18419
Exhibit S-2.4
Witness: Olumide O. Makinde

Henry Hub ($/Mmbtu)

Line No.	Month	Reference [1]	High Gas [2]	Low Gas [3]	Emerging Tech [4]	Aggressive CO2 [1]	2017 ref [6]	ELG [7]
1	2/1/2016	0.00	0.00	2.25	0.00	0.00	0.00	2.20
2	3/1/2016	0.00	0.00	2.13	0.00	0.00	2.88	2.14
3	4/1/2016	0.00	0.00	2.20	0.00	0.00	3.10	2.19
4	5/1/2016	0.00	0.00	2.26	0.00	0.00	3.17	2.25
5	6/1/2016	2.10	2.10	2.30	2.10	2.10	3.29	2.30
6	7/1/2016	2.23	2.23	2.35	2.23	2.23	3.38	2.36
7	8/1/2016	2.30	2.30	2.38	2.30	2.30	3.41	2.38
8	9/1/2016	2.34	2.34	2.39	2.34	2.34	3.39	2.39
9	10/1/2016	2.42	2.42	2.42	2.42	2.42	3.41	2.42
10	11/1/2016	2.65	2.65	2.49	2.65	2.65	3.46	2.51
11	12/1/2016	2.95	2.95	2.67	2.95	2.95	3.58	2.70
12	1/1/2017	3.09	3.09	2.80	3.09	3.09	3.66	2.82
13	2/1/2017	3.08	3.08	2.80	3.08	3.08	3.62	2.82
14	3/1/2017	3.04	3.04	2.76	3.04	3.04	3.52	2.78
15	4/1/2017	2.85	2.85	2.58	2.85	2.85	2.96	2.60
16	5/1/2017	2.84	2.84	2.58	2.84	2.84	2.89	2.61
17	6/1/2017	2.87	2.87	2.62	2.87	2.87	2.91	2.65
18	7/1/2017	2.91	2.91	2.66	2.91	2.91	2.94	2.69
19	8/1/2017	2.92	2.92	2.68	2.92	2.92	2.94	2.70
20	9/1/2017	2.91	2.91	2.67	2.91	2.91	2.92	2.69
21	10/1/2017	2.94	2.94	2.68	2.94	2.94	2.93	2.71
22	11/1/2017	3.01	3.01	2.73	3.01	3.01	2.98	2.78
23	12/1/2017	3.15	3.15	2.84	3.15	3.15	3.12	2.92
24	1/1/2018	3.26	3.26	2.98	3.26	3.26	3.21	3.02
25	2/1/2018	3.23	3.23	2.96	3.23	3.23	3.19	3.00
26	3/1/2018	3.17	3.17	2.86	3.17	3.17	3.12	2.94
27	4/1/2018	2.84	2.84	2.67	2.84	2.84	2.72	2.67
28	5/1/2018	2.83	2.83	2.69	2.83	2.83	2.68	2.67
29	6/1/2018	2.86	2.86	2.72	2.86	2.86	2.70	2.70
30	7/1/2018	2.90	2.90	2.90	2.90	2.90	2.73	2.74
31	8/1/2018	2.90	2.90	2.94	2.90	2.90	2.74	2.75
32	9/1/2018	2.89	2.89	2.88	2.89	2.89	2.74	2.74
33	10/1/2018	2.91	2.91	2.90	2.91	2.91	2.76	2.77
34	11/1/2018	2.98	2.98	2.93	2.98	2.98	2.84	2.84
35	12/1/2018	3.12	3.12	2.99	3.12	3.12	2.98	2.98
36	1/1/2019	3.23	3.23	3.04	3.23	3.23	3.10	3.08
37	2/1/2019	3.21	3.21	2.91	3.21	3.21	3.07	3.07

Notes

1 KJC-35 "Forwards Vs Pace 1 Yr trans", Column L.
2 KJC-229, "Blended Gas Forecast", column O.
3 KJC-275, "Blended Gas Forecast", Column L.
4 KJC-193, "Blended Gas Forecast" Column O.
6 KJC-353, "Blended Gas Forecast", Column O.
7 KJC-463, Column l.

MICHIGAN PUBLIC SERVICE COMMISSION
Staff
Monthly Long-Term Natural GasPrice Forecasts

Case No.: U-18419
Exhibit S-2.4
Witness: Olumide O. Makinde

Henry Hub ($/Mmbtu)

Line No.	Month	Reference [1]	High Gas [2]	Low Gas [3]	Emerging Tech [4]	Aggressive CO^2 [1]	2017 ref [6]	ELG [7]
1	3/1/2019	3.14	3.14	2.76	3.14	3.14	3.01	3.01
2	4/1/2019	2.85	2.85	2.72	2.85	2.85	2.70	2.74
3	5/1/2019	2.85	2.85	2.75	2.85	2.85	2.69	2.73
4	6/1/2019	2.88	2.88	2.79	2.88	2.88	2.72	2.77
5	7/1/2019	2.92	2.92	3.22	2.92	2.92	2.75	2.80
6	8/1/2019	2.93	2.93	3.22	2.93	2.93	2.78	2.82
7	9/1/2019	2.92	2.92	3.17	2.92	2.92	2.78	2.81
8	10/1/2019	2.94	2.94	3.17	2.94	2.94	2.81	2.84
9	11/1/2019	3.02	3.02	3.20	3.02	3.02	2.88	2.91
10	12/1/2019	3.16	3.16	3.26	3.16	3.16	3.03	3.06
11	1/1/2020	3.29	3.29	3.34	3.29	3.29	3.15	3.17
12	2/1/2020	3.27	3.27	2.91	3.27	3.27	3.12	3.16
13	3/1/2020	3.20	3.20	2.92	3.20	3.20	3.05	3.10
14	4/1/2020	2.95	2.95	2.93	2.95	2.95	2.74	2.83
15	5/1/2020	2.95	2.95	3.03	2.95	2.95	2.73	2.83
16	6/1/2020	2.98	2.98	3.16	2.98	2.98	2.75	2.86
17	7/1/2020	3.01	3.01	3.69	3.01	3.01	2.78	2.89
18	8/1/2020	3.04	3.04	3.68	3.04	3.04	2.81	2.92
19	9/1/2020	3.03	3.03	3.53	3.03	3.03	2.81	2.91
20	10/1/2020	3.17	3.17	3.39	3.17	3.17	2.84	2.94
21	11/1/2020	3.15	3.15	3.37	3.15	3.15	2.92	3.02
22	12/1/2020	3.30	3.30	3.43	3.30	3.30	3.06	3.19
23	1/1/2021	3.43	3.43	3.49	3.43	3.43	3.19	3.30
24	2/1/2021	3.42	3.42	3.20	3.42	3.42	3.16	3.29
25	3/1/2021	3.35	3.35	3.01	3.35	3.35	3.10	3.23
26	4/1/2021	3.10	3.10	3.01	3.10	3.10	2.78	2.95
27	5/1/2021	3.10	3.10	3.08	3.10	3.10	2.77	2.94
28	6/1/2021	3.13	3.13	3.18	3.13	3.13	2.80	2.97
29	7/1/2021	3.16	3.16	3.65	3.16	3.16	2.83	3.01
30	8/1/2021	3.20	3.20	3.65	3.20	3.20	2.86	3.04
31	9/1/2021	3.20	3.20	3.49	3.20	3.20	2.86	3.04
32	10/1/2021	3.23	3.23	3.34	3.23	3.23	2.89	3.08
33	11/1/2021	3.31	3.31	3.28	3.31	3.31	2.97	3.16
34	12/1/2021	3.46	3.46	3.37	3.46	3.46	3.12	3.33
35	1/1/2022	3.82	4.43	3.43	3.75	3.82	3.56	3.74
36	2/1/2022	3.72	4.44	3.29	3.65	3.72	3.51	3.73
37	3/1/2022	3.51	4.42	3.15	3.47	3.51	3.46	3.67

Notes

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6 KJC-353, "Blended Gas Forecast", Column O.
7 KJC-463, Column l.

MICHIGAN PUBLIC SERVICE COMMISSION
Staff
Monthly Long-Term Natural GasPrice Forecasts

Case No.: U-18419
Exhibit S-2.4
Witness: Olumide O. Makinde

Henry Hub ($/Mmbtu)

Line No.	Month	Reference [1]	High Gas [2]	Low Gas [3]	Emerging Tech [4]	Aggressive CO2 [1]	A-30 [5]	2017 ref [6]	ELG [7]
1	4/1/2022	3.36	4.37	3.08	3.31	3.36		3.21	3.39
2	5/1/2022	3.37	4.43	3.12	3.32	3.37		3.22	3.39
3	6/1/2022	3.43	5.05	3.25	3.37	3.43	2.798	3.26	3.42
4	7/1/2022	3.71	4.98	3.78	3.61	3.71	2.83	3.36	3.45
5	8/1/2022	3.75	4.49	3.80	3.64	3.75	2.858	3.39	3.49
6	9/1/2022	3.65	4.39	3.54	3.57	3.65	2.863	3.34	3.49
7	10/1/2022	3.67	4.43	3.33	3.59	3.67	2.891	3.33	3.52
8	11/1/2022	3.70	4.49	3.28	3.63	3.70	2.969	3.39	3.60
9	12/1/2022	3.85	4.63	3.38	3.75	3.85	3.115	3.51	3.77
10	1/1/2023	4.20	5.43	3.44	4.06	4.20	3.562941	3.93	4.20
11	2/1/2023	4.03	5.46	3.36	3.88	4.03	3.510612	3.86	4.03
12	3/1/2023	3.66	5.49	3.26	3.58	3.66	3.463724	3.83	3.66
13	4/1/2023	3.62	5.63	3.14	3.51	3.62	3.205996	3.63	3.62
14	5/1/2023	3.64	5.77	3.19	3.53	3.64	3.218721	3.67	3.64
15	6/1/2023	3.73	6.98	3.34	3.61	3.73	3.2598	3.72	3.73
16	7/1/2023	4.26	6.79	3.84	4.05	4.26	3.359207	3.89	4.26
17	8/1/2023	4.31	5.78	3.88	4.08	4.31	3.394977	3.93	4.31
18	9/1/2023	4.10	5.58	3.61	3.95	4.10	3.337125	3.81	4.10
19	10/1/2023	4.11	5.63	3.42	3.95	4.11	3.334704	3.78	4.11
20	11/1/2023	4.09	5.67	3.37	3.95	4.09	3.386197	3.80	4.09
21	12/1/2023	4.23	5.80	3.49	4.05	4.23	3.511748	3.91	4.23
22	1/1/2024	4.29	5.86	3.57	4.10	4.29	3.931883	4.30	4.29
23	2/1/2024	4.00	5.89	3.42	3.89	4.00	3.862224	4.21	4.00
24	3/1/2024	3.79	5.93	3.43	3.73	3.79	3.832447	4.20	3.79
25	4/1/2024	3.74	6.10	3.29	3.65	3.74	3.631992	4.06	3.74
26	5/1/2024	3.88	6.25	3.37	3.79	3.88	3.667442	4.12	3.88
27	6/1/2024	3.99	7.03	3.54	3.89	3.99	3.721601	4.18	3.99
28	7/1/2024	4.53	6.20	4.03	4.31	4.53	3.888415	4.42	4.53
29	8/1/2024	4.58	6.02	4.07	4.34	4.58	3.931953	4.47	4.58
30	9/1/2024	4.30	5.85	3.72	4.14	4.30	3.811251	4.29	4.30
31	10/1/2024	4.29	5.91	3.54	4.15	4.29	3.778408	4.22	4.29
32	11/1/2024	4.23	5.95	3.48	4.10	4.23	3.803395	4.22	4.23
33	12/1/2024	4.34	6.12	3.58	4.17	4.34	3.908495	4.31	4.34
34	1/1/2025	4.57	6.19	3.65	4.38	4.57	4.300824	4.30	4.57
35	2/1/2025	4.38	6.20	3.56	4.23	4.38	4.213837	4.24	4.38
36	3/1/2025	4.01	6.25	3.50	3.94	4.01	4.201171	4.24	4.01
37	4/1/2025	3.97	6.36	3.38	3.86	3.97	4.057988	4.10	3.97

Notes

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7 KJC-463, Column l.

MICHIGAN PUBLIC SERVICE COMMISSION
Staff
Monthly Long-Term Natural GasPrice Forecasts

Case No.: U-18419
Exhibit S-2.4
Witness: Olumide O. Makinde

Henry Hub ($/Mmbtu)

Line No.	Month	Reference [1]	High Gas [2]	Low Gas [3]	Emerging Tech [4]	Aggressive CO2 [1]	A-30 [5]	2017 ref [6]	ELG [7]
1	5/1/2025	4.06	6.57	3.43	3.96	4.06	4.116163	4.13	4.06
2	6/1/2025	4.14	7.34	3.59	4.02	4.14	4.183401	4.21	4.14
3	7/1/2025	4.62	7.13	4.03	4.41	4.62	4.417622	4.44	4.62
4	8/1/2025	4.68	6.24	4.07	4.45	4.68	4.46893	4.49	4.68
5	9/1/2025	4.46	6.07	3.75	4.31	4.46	4.285376	4.29	4.46
6	10/1/2025	4.48	6.13	3.61	4.34	4.48	4.222112	4.24	4.48
7	11/1/2025	4.44	6.19	3.51	4.32	4.44	4.220592	4.23	4.44
8	12/1/2025	4.58	6.35	3.60	4.40	4.58	4.305243	4.30	4.58
9	1/1/2026	4.79	6.42	3.71	4.60	4.79	4.297917	4.54	4.79
10	2/1/2026	4.65	6.43	3.67	4.53	4.65	4.244326	4.46	4.65
11	3/1/2026	4.31	6.47	3.62	4.20	4.31	4.243022	4.47	4.31
12	4/1/2026	4.27	6.61	3.51	4.12	4.27	4.096207	4.32	4.27
13	5/1/2026	4.37	6.81	3.56	4.21	4.37	4.131396	4.36	4.37
14	6/1/2026	4.44	7.73	3.72	4.28	4.44	4.212248	4.46	4.44
15	7/1/2026	4.95	7.56	4.23	4.67	4.95	4.440079	4.69	4.95
16	8/1/2026	5.01	6.55	4.27	4.71	5.01	4.492557	4.75	5.01
17	9/1/2026	4.80	6.38	3.89	4.60	4.80	4.292268	4.54	4.80
18	10/1/2026	4.81	6.45	3.72	4.62	4.81	4.239697	4.45	4.81
19	11/1/2026	4.78	6.51	3.60	4.63	4.78	4.226293	4.46	4.78
20	12/1/2026	4.90	6.71	3.70	4.70	4.90	4.301149	4.52	4.90
21	1/1/2027	5.05	6.78	3.79	4.83	5.05	4.544433	4.72	5.05
22	2/1/2027	4.91	6.79	3.74	4.69	4.91	4.463529	4.61	4.91
23	3/1/2027	4.56	6.83	3.69	4.40	4.56	4.474905	4.66	4.56
24	4/1/2027	4.50	6.93	3.58	4.29	4.50	4.321474	4.51	4.50
25	5/1/2027	4.64	7.17	3.64	4.43	4.64	4.358367	4.57	4.64
26	6/1/2027	4.72	7.89	3.82	4.51	4.72	4.45569	4.65	4.72
27	7/1/2027	5.25	7.73	4.38	4.94	5.25	4.693896	4.91	5.25
28	8/1/2027	5.32	6.70	4.41	4.99	5.32	4.748833	4.95	5.32
29	9/1/2027	5.06	6.53	4.02	4.82	5.06	4.539447	4.74	5.06
30	10/1/2027	5.05	6.61	3.78	4.84	5.05	4.44632	4.67	5.05
31	11/1/2027	5.03	6.67	3.70	4.85	5.03	4.457598	4.67	5.03
32	12/1/2027	5.15	6.94	3.80	4.90	5.15	4.523151	4.72	5.15
33	1/1/2028	5.32	7.02	3.88	5.07	5.32	4.717321	4.95	5.32
34	2/1/2028	4.97	7.01	3.73	4.70	4.97	4.608725	4.89	4.97
35	3/1/2028	4.79	7.06	3.75	4.55	4.79	4.65937	4.91	4.79
36	4/1/2028	4.75	7.13	3.65	4.44	4.75	4.51496	4.75	4.75
37	5/1/2028	4.89	7.37	3.74	4.58	4.89	4.566062	4.80	4.89

Notes

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MICHIGAN PUBLIC SERVICE COMMISSION
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Monthly Long-Term Natural GasPrice Forecasts

Case No.: U-18419
Exhibit S-2.4
Witness: Olumide O. Makinde

Henry Hub ($/Mmbtu)

Line No.	Month	Reference [1]	High Gas [2]	Low Gas [3]	Emerging Tech [4]	Aggressive CO^2 [1]	2017 ref [6]	ELG [7]
1	6/1/2028	4.98	8.38	3.92	4.67	4.98	4.89	4.98
2	7/1/2028	5.55	7.43	4.52	5.11	5.55	5.16	5.55
3	8/1/2028	5.61	7.06	4.55	5.15	5.61	5.21	5.61
4	9/1/2028	5.31	6.90	4.15	4.97	5.31	4.97	5.31
5	10/1/2028	5.31	7.01	3.89	4.99	5.31	4.88	5.31
6	11/1/2028	5.27	7.08	3.80	4.97	5.27	4.88	5.27
7	12/1/2028	5.39	7.44	3.90	5.05	5.39	4.94	5.39
8	1/1/2029	5.61	7.51	3.98	5.26	5.61	5.22	5.61
9	2/1/2029	5.44	7.47	3.92	5.09	5.44	5.17	5.44
10	3/1/2029	5.07	7.53	3.87	4.77	5.07	5.17	5.07
11	4/1/2029	4.99	7.58	3.71	4.62	4.99	5.03	4.99
12	5/1/2029	5.15	7.88	3.81	4.77	5.15	5.08	5.15
13	6/1/2029	5.24	8.63	4.04	4.85	5.24	5.17	5.24
14	7/1/2029	5.80	8.38	4.63	5.26	5.80	5.45	5.80
15	8/1/2029	5.87	7.29	4.68	5.30	5.87	5.51	5.87
16	9/1/2029	5.57	7.14	4.27	5.13	5.57	5.26	5.57
17	10/1/2029	5.58	7.26	3.95	5.18	5.58	5.16	5.58
18	11/1/2029	5.53	7.34	3.88	5.17	5.53	5.14	5.53
19	12/1/2029	5.64	7.73	3.98	5.24	5.64	5.23	5.64
20	1/1/2030	5.83	7.81	4.05	5.41	5.83	5.39	5.83
21	2/1/2030	5.62	7.77	3.98	5.24	5.62	5.35	5.62
22	3/1/2030	5.25	7.82	3.93	4.90	5.25	5.35	5.25
23	4/1/2030	5.17	7.88	3.77	4.73	5.17	5.20	5.17
24	5/1/2030	5.36	8.17	3.90	4.90	5.36	5.24	5.36
25	6/1/2030	5.47	8.70	4.17	4.98	5.47	5.36	5.47
26	7/1/2030	6.00	8.48	4.74	5.36	6.00	5.65	6.00
27	8/1/2030	6.07	7.52	4.78	5.40	6.07	5.69	6.07
28	9/1/2030	5.78	7.39	4.38	5.25	5.78	5.45	5.78
29	10/1/2030	5.77	7.51	4.07	5.28	5.77	5.34	5.77
30	11/1/2030	5.69	7.59	3.96	5.27	5.69	5.32	5.69
31	12/1/2030	5.82	7.99	4.08	5.36	5.82	5.40	5.82
32	1/1/2031	6.07	8.06	4.17	5.59	6.07	5.54	6.07
33	2/1/2031	5.86	8.00	4.10	5.36	5.86	5.41	5.86
34	3/1/2031	5.45	8.06	3.99	5.02	5.45	5.47	5.45
35	4/1/2031	5.39	8.11	3.86	4.87	5.39	5.33	5.39
36	5/1/2031	5.55	8.41	3.99	5.02	5.55	5.39	5.55
37	6/1/2031	5.68	8.92	4.26	5.11	5.68	5.54	5.68

Notes

1 KJC-35 "Forwards Vs Pace 1 Yr trans", Column L.
2 KJC-229, "Blended Gas Forecast", column O.
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7 KJC-463, Column l.

MICHIGAN PUBLIC SERVICE COMMISSION
Staff
Monthly Long-Term Natural GasPrice Forecasts

Case No.: U-18419
Exhibit S-2.4
Witness: Olumide O. Makinde

Henry Hub ($/Mmbtu)

Line No.	Month	Reference [1]	High Gas [2]	Low Gas [3]	Emerging Tech [4]	Aggressive CO2 [1]	2017 ref [6]	ELG [7]
1	7/1/2031	6.21	8.67	4.86	5.45	6.21	5.83	6.21
2	8/1/2031	6.28	7.74	4.91	5.50	6.28	5.88	6.28
3	9/1/2031	5.97	7.59	4.51	5.35	5.97	5.62	5.97
4	10/1/2031	5.96	7.73	4.18	5.41	5.96	5.49	5.96
5	11/1/2031	5.86	7.81	4.06	5.41	5.86	5.47	5.86
6	12/1/2031	6.00	8.20	4.19	5.50	6.00	5.54	6.00
7	1/1/2032	6.25	8.28	4.29	5.72	6.25	5.79	6.25
8	2/1/2032	5.79	8.21	4.05	5.27	5.79	5.74	5.79
9	3/1/2032	5.58	8.27	4.04	5.11	5.58	5.73	5.58
10	4/1/2032	5.51	8.34	3.96	4.92	5.51	5.58	5.51
11	5/1/2032	5.71	8.64	4.11	5.10	5.71	5.63	5.71
12	6/1/2032	5.85	9.24	4.41	5.20	5.85	5.79	5.85
13	7/1/2032	6.37	8.43	5.05	5.51	6.37	6.07	6.37
14	8/1/2032	6.42	8.03	5.11	5.55	6.42	6.13	6.42
15	9/1/2032	6.11	7.87	4.64	5.42	6.11	5.85	6.11
16	10/1/2032	6.09	8.01	4.34	5.46	6.09	5.72	6.09
17	11/1/2032	5.98	8.10	4.16	5.47	5.98	5.70	5.98
18	12/1/2032	6.11	8.50	4.30	5.56	6.11	5.77	6.11
19	1/1/2033	6.36	8.58	4.40	5.79	6.36	6.05	6.36
20	2/1/2033	6.14	8.51	4.33	5.54	6.14	6.02	6.14
21	3/1/2033	5.68	8.58	4.17	5.17	5.68	5.99	5.68
22	4/1/2033	5.61	8.65	4.07	4.97	5.61	5.82	5.61
23	5/1/2033	5.80	8.94	4.22	5.13	5.80	5.88	5.80
24	6/1/2033	5.95	9.39	4.54	5.22	5.95	6.04	5.95
25	7/1/2033	6.48	9.10	5.19	5.57	6.48	6.34	6.48
26	8/1/2033	6.53	8.16	5.23	5.60	6.53	6.40	6.53
27	9/1/2033	6.20	8.02	4.74	5.46	6.20	6.12	6.20
28	10/1/2033	6.18	8.15	4.42	5.51	6.18	5.98	6.18
29	11/1/2033	6.07	8.24	4.27	5.53	6.07	5.98	6.07
30	12/1/2033	6.20	8.58	4.42	5.61	6.20	6.05	6.20
31	1/1/2034	6.40	8.66	4.48	5.79	6.40	6.24	6.40
32	2/1/2034	6.22	8.60	4.41	5.61	6.22	6.22	6.22
33	3/1/2034	5.74	8.66	4.24	5.19	5.74	6.20	5.74
34	4/1/2034	5.66	8.71	4.13	4.99	5.66	6.02	5.66
35	5/1/2034	5.89	9.02	4.30	5.19	5.89	6.08	5.89
36	6/1/2034	6.05	9.54	4.65	5.27	6.05	6.26	6.05
37	7/1/2034	6.56	9.25	5.29	5.58	6.56	6.58	6.56

Notes

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2 KJC-229, "Blended Gas Forecast", column O.
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7 KJC-463, Column l.

MICHIGAN PUBLIC SERVICE COMMISSION
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Monthly Long-Term Natural GasPrice Forecasts

Case No.: U-18419
Exhibit S-2.4
Witness: Olumide O. Makinde

Henry Hub ($/Mmbtu)

Line No.	Month	Reference [1]	High Gas [2]	Low Gas [3]	Emerging Tech [4]	Aggressive CO^2 [1]	2017 ref [6]	ELG [7]
1	8/1/2034	6.61	8.40	5.32	5.60	6.61	6.65	6.61
2	9/1/2034	6.30	8.25	4.83	5.51	6.30	6.33	6.30
3	10/1/2034	6.25	8.39	4.52	5.55	6.25	6.20	6.25
4	11/1/2034	6.12	8.47	4.35	5.53	6.12	6.15	6.12
5	12/1/2034	6.25	8.84	4.51	5.64	6.25	6.23	6.25
6	1/1/2035	6.49	8.94	4.63	5.85	6.49	6.54	6.49
7	2/1/2035	6.30	8.88	4.62	5.66	6.30	6.54	6.30
8	3/1/2035	5.79	8.94	4.37	5.26	5.79	6.56	5.79
9	4/1/2035	5.73	8.99	4.28	5.03	5.73	6.38	5.73
10	5/1/2035	5.93	9.30	4.47	5.21	5.93	6.44	5.93
11	6/1/2035	6.09	10.17	4.82	5.30	6.09	6.68	6.09
12	7/1/2035	6.66	9.87	5.47	5.66	6.66	6.94	6.66
13	8/1/2035	6.71	8.88	5.50	5.68	6.71	7.01	6.71
14	9/1/2035	6.38	8.73	5.04	5.56	6.38	6.65	6.38
15	10/1/2035	6.34	8.88	4.66	5.61	6.34	6.37	6.34
16	11/1/2035	6.17	8.96	4.32	5.55	6.17	6.35	6.17
17	12/1/2035	6.31	9.35	4.37	5.69	6.31	6.49	6.31
18	1/1/2036	6.63	9.45	4.74	5.98	6.63	6.58	6.63
19	2/1/2036	6.44	9.21	4.72	5.79	6.44	6.64	6.44
20	3/1/2036	5.92	9.25	4.47	5.37	5.92	6.69	5.92
21	4/1/2036	5.86	9.02	4.38	5.14	5.86	6.51	5.86
22	5/1/2036	6.06	9.14	4.57	5.33	6.06	6.59	6.06
23	6/1/2036	6.23	0.00	4.93	5.41	6.23	6.83	6.23
24	7/1/2036	6.80	0.00	5.59	5.78	6.80	7.10	6.80
25	8/1/2036	6.86	0.00	5.62	5.81	6.86	7.16	6.86
26	9/1/2036	6.52	0.00	5.15	5.68	6.52	6.79	6.52
27	10/1/2036	6.48	0.00	4.76	5.73	6.48	6.51	6.48
28	11/1/2036	6.30	0.00	4.41	5.67	6.30	6.49	6.30
29	12/1/2036	6.45	0.00	4.46	5.81	6.45	6.63	6.45
30	1/1/2037	6.78	0.00	4.84	6.11	6.78	6.86	6.78
31	2/1/2037	6.58	0.00	4.82	5.91	6.58	6.92	6.58
32	3/1/2037	6.05	0.00	4.57	5.49	6.05	6.98	6.05
33	4/1/2037	5.99	0.00	4.48	5.26	5.99	6.79	5.99
34	5/1/2037	6.19	0.00	4.67	5.44	6.19	6.87	6.19
35	6/1/2037	6.36	0.00	5.04	5.53	6.36	7.12	6.36
36	7/1/2037	6.95	0.00	5.72	5.91	6.95	7.41	6.95
37	8/1/2037	7.01	0.00	5.74	5.93	7.01	7.48	7.01

Notes

1 KJC-35 "Forwards Vs Pace 1 Yr trans", Column L.
2 KJC-229, "Blended Gas Forecast", column O.
3 KJC-275, "Blended Gas Forecast", Column L.
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6 KJC-353, "Blended Gas Forecast", Column O.
7 KJC-463, Column l.

MICHIGAN PUBLIC SERVICE COMMISSION
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Monthly Long-Term Natural GasPrice Forecasts

Case No.: U-18419
Exhibit S-2.4
Witness: Olumide O. Makinde

Henry Hub ($/Mmbtu)

Line No.	Month	Reference [1]	High Gas [2]	Low Gas [3]	Emerging Tech [4]	Aggressive CO^2 [1]	2017 ref [6]	ELG [7]
1	9/1/2037	6.66	0.00	5.26	5.81	6.66	7.08	6.66
2	10/1/2037	6.62	0.00	4.87	5.86	6.62	6.78	6.62
3	11/1/2037	6.44	0.00	4.51	5.80	6.44	6.76	6.44
4	12/1/2037	6.59	0.00	4.56	5.94	6.59	6.90	6.59
5	1/1/2038	6.92	0.00	4.95	6.25	6.92	7.08	6.92
6	2/1/2038	6.73	0.00	4.93	6.04	6.73	7.14	6.73
7	3/1/2038	6.18	0.00	4.67	5.61	6.18	7.19	6.18
8	4/1/2038	6.12	0.00	4.57	5.37	6.12	7.01	6.12
9	5/1/2038	6.33	0.00	4.77	5.56	6.33	7.09	6.33
10	6/1/2038	6.50	0.00	5.15	5.65	6.50	7.34	6.50
11	7/1/2038	7.11	0.00	5.84	6.04	7.11	7.64	7.11
12	8/1/2038	7.16	0.00	5.87	6.06	7.16	7.71	7.16
13	9/1/2038	6.81	0.00	5.38	5.94	6.81	7.31	6.81
14	10/1/2038	6.77	0.00	4.98	5.99	6.77	7.00	6.77
15	11/1/2038	6.58	0.00	4.61	5.92	6.58	6.98	6.58
16	12/1/2038	6.74	0.00	4.66	6.07	6.74	7.13	6.74
17	1/1/2039	7.08	0.00	5.06	6.39	7.08	7.20	7.08
18	2/1/2039	6.88	0.00	5.04	6.18	6.88	7.26	6.88
19	3/1/2039	6.32	0.00	4.77	5.73	6.32	7.30	6.32
20	4/1/2039	6.25	0.00	4.67	5.49	6.25	7.10	6.25
21	5/1/2039	6.47	0.00	4.87	5.68	6.47	7.18	6.47
22	6/1/2039	6.65	0.00	5.26	5.78	6.65	7.43	6.65
23	7/1/2039	7.26	0.00	5.97	6.17	7.26	7.74	7.26
24	8/1/2039	7.32	0.00	6.00	6.20	7.32	7.81	7.32
25	9/1/2039	6.96	0.00	5.49	6.07	6.96	7.41	6.96
26	10/1/2039	6.91	0.00	5.08	6.12	6.91	7.09	6.91
27	11/1/2039	6.73	0.00	4.71	6.05	6.73	6.97	6.73
28	12/1/2039	6.89	0.00	4.76	6.21	6.89	7.00	6.89
29	1/1/2040	7.23	0.00	5.17	6.53	7.23	0.00	7.23
30	2/1/2040	7.03	0.00	5.15	6.31	7.03	0.00	7.03
31	3/1/2040	6.46	0.00	4.87	5.86	6.46	0.00	6.46
32	4/1/2040	6.39	0.00	4.78	5.61	6.39	0.00	6.39
33	5/1/2040	6.61	0.00	4.98	5.81	6.61	0.00	6.61
34	6/1/2040	6.79	0.00	5.37	5.91	6.79	0.00	6.79
35	7/1/2040	7.42	0.00	6.10	6.31	7.42	0.00	7.42
36	8/1/2040	7.48	0.00	6.13	6.33	7.48	0.00	7.48
37	9/1/2040	7.11	0.00	5.62	6.20	7.11	0.00	7.11

Notes

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MICHIGAN PUBLIC SERVICE COMMISSION
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Monthly Long-Term Natural GasPrice Forecasts

Case No.: U-18419
Exhibit S-2.4
Witness: Olumide O. Makinde
Page: 9 of 9

Henry Hub ($/Mmbtu)

Line No.	Month	Reference [1]	High Gas [2]	Low Gas [3]	Emerging Tech [4]	Aggressive CO^2 [1]	2017 ref [6]	ELG [7]
1	10/1/2040	7.07	0.00	5.20	6.25	7.07	0.00	7.07
2	11/1/2040	6.88	0.00	4.81	6.19	6.88	0.00	6.88
3	12/1/2040	7.04	0.00	4.87	6.34	7.04	0.00	7.04

Notes

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7 KJC-463, Column l.

Question: Please describe in detail how the natural gas price forecasts were formulated, with emphasis on the reference case and the high gas price scenarios.

a. Including the assumptions that went into the development of the high natural gas forecast, and the logic behind those assumptions.

Answer: In the Reference case, the formulation of the natural gas price forecast through 2021 used the forward fuel prices supported by Witness Swiech. This forecast process is described in Witness Swiech's testimony on page DS-10, line 10, through DS-11, line 13. Gas prices for Henry Hub and Dawn were determined using CME/NYMEX near-term futures prices as of May 12, 2016. Transportation costs were added to the Dawn Hub price to determine the delivered gas price. The difference between this delivered gas price and the Henry Hub futures is the Fuel Supply delivery adder.

In years 2023 to 2040, the Company used a gas forecast determined through Fundamental modeling. The Fundamental Modeling was completed by PACE Global, using the Aurora® and GPCM Gas +model. A 1-year transition in 2022 was used to smoothly get us to the fundamental forecast in 2023. This transition was formulated by applying a linear interpolation between 2021 Forward data and 2023 Fundamental data. The Fuel Supply delivery adder was then applied.

In the High Gas Scenario, we used the forward fuel prices supported by witness Swiech through 2021, based on the Henry Hub futures prices as of May 12, 2016 for years 2016-2018. Starting in 2019, we used the Fundamental gas price forecast from the High Gas Scenario, completed by PACE Global, using the Aurora® and GPCM Gas +model. There was no transition. The Fuel Supply delivery adder was then applied.

The assumptions for the High Gas Scenario were higher natural gas marginal production costs coming about from higher demand, increased LNG exports, increased costs put on fracking operations by an increase in gas industry regulations or a combination of the three.

Question: See Table 1: Comparison of Company's forecasted natural gas price (annually) vs EIA natural gas forecast.

a. Please provide possible reasons for the 22% average difference between the reference case and the high gas scenarios of the company vs EIA.

Answer: The question is unclear in its current form, but assuming you are asking why is EIA's high case 62% higher than their reference case, while DTE's high case is only 40% higher than their reference case?" (62% - 40% = 22%), we would answer as follows:

They are separate forecasts and used different assumptions. Some possible assumption differences include:

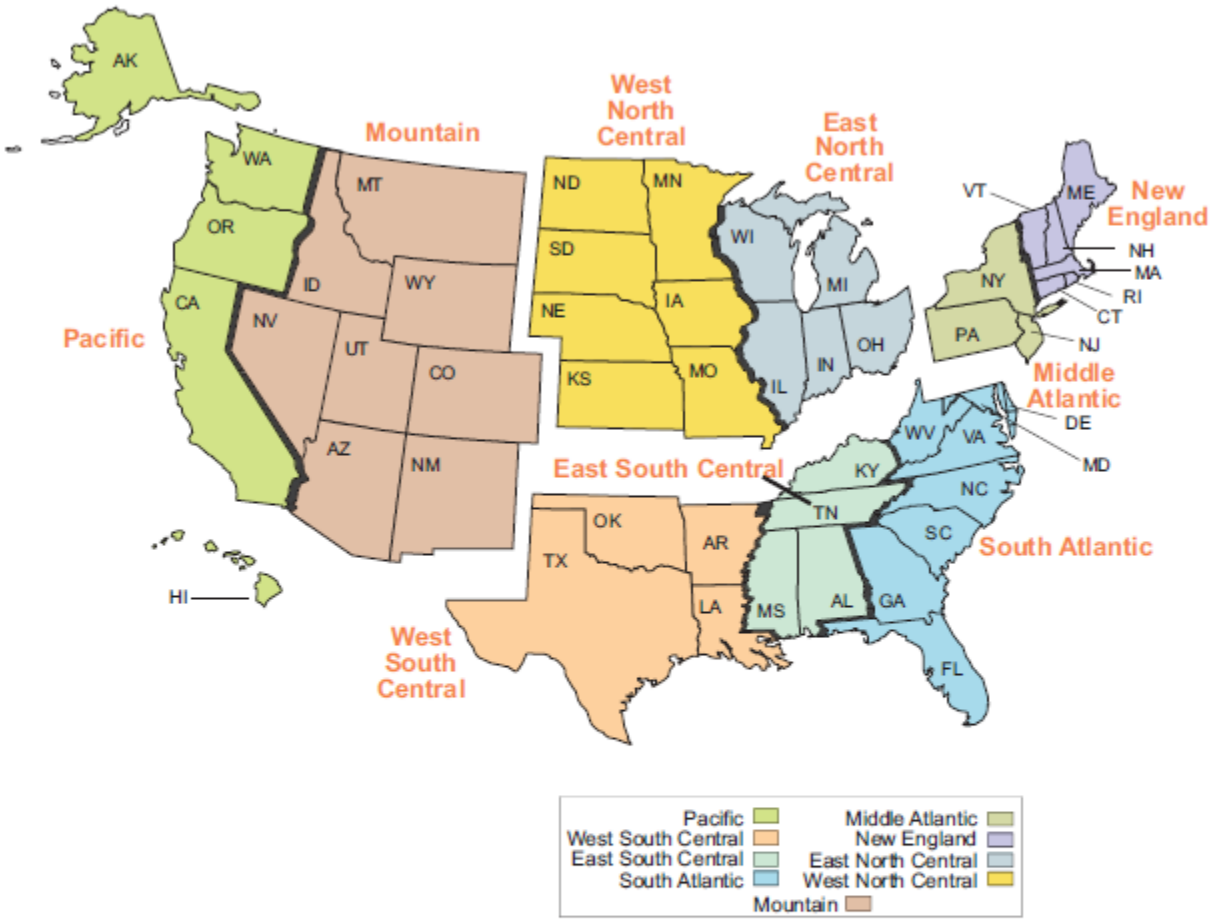
1. Different pipelines and different dates associated with pipeline projects assumed
2. Different starting dates of forecasts
3. Different gas supply and demand price curves
4. Different underlying Electrical system usage assumptions
5. Different production assumptions for the various shale basins
6. Different gas import and export assumptions
7. Different Models used

Delivered energy is measured as the heat content of energy at the site of use. It includes the heat content of electricity (3,412 Btu/kWh) but does not include conversion losses at generation plants in the electricity sector. Delivered energy also includes fuels (natural gas, coal, liquids, and renewables) used for combined heat and power facilities (cogeneration) in the industrial sector.

Source: U.S. Energy Information Administration, Office of Energy Analysis.

Regional Maps

Figure F1. United States Census Divisions



Source: U.S. Energy Information Administration, Office of Energy Analysis.

Figure F1. United States Census Divisions *(continued)*

Division 1
New England

Connecticut
Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

Division 2
Middle Atlantic

New Jersey
New York
Pennsylvania

Division 3
East North Central

Illinois
Indiana
Michigan
Ohio
Wisconsin

Division 4
West North Central

Iowa
Kansas
Minnesota
Missouri
Nebraska
North Dakota
South Dakota

Division 5
South Atlantic

Delaware
District of Columbia
Florida
Georgia
Maryland
North Carolina
South Carolina
Virginia
West Virginia

Division 6
East South Central

Alabama
Kentucky
Mississippi
Tennessee

Division 7
West South Central

Arkansas
Louisiana
Oklahoma
Texas

Division 8
Mountain

Arizona
Colorado
Idaho
Montana
Nevada
New Mexico
Utah
Wyoming

Division 9
Pacific

Alaska
California
Hawaii
Oregon
Washington

Annual Energy Outlook 2017 cases

Table 1.1 provides a summary of the cases produced as part of AEO2017. For each case, the table gives the name used in AEO2017 and a brief description. The text prior to Table 1.1 describes the various cases in more detail. Regional results and other details of the projections are available at http://www.eia.gov/outlooks/aeo/tables_ref.cfm#supplement.

Macroeconomic growth cases

In addition to the AEO2017 Reference case, Low Economic Growth and High Economic Growth cases were developed to reflect the uncertainty in projections of economic growth. The alternative cases are intended to show the effects of alternative growth assumptions on energy market projections. The cases are described as follows:

- In the Reference case, population grows by an average rate of 0.6%/year, nonfarm employment by 0.7%/year, and productivity by 1.7%/year from 2016 to 2050. Economic output as measured by real GDP increases by 2.1%/year from 2016 through 2050, and growth in real disposable income per capita averages 1.5%/year.
- The Low Economic Growth case assumes lower average annual growth rates for population (0.5%/year) and productivity (1.3%/year), resulting in lower growth in nonfarm employment (0.5%/year), higher prices and interest rates, and lower growth in industrial output. In the Low Economic Growth case, economic output as measured by real GDP increases by 1.6%/year from 2016 through 2050, and growth in real disposable income per capita averages 1.3%/year.
- The High Economic Growth case assumes higher average growth rates for population (0.8%/year) and productivity (2.0%/year), resulting in higher nonfarm employment (0.9%/year). With higher productivity gains and employment growth, inflation and interest rates are lower than in the Reference case for most years, and consequently economic output grows at a higher rate (2.6%/year) than in the Reference case (2.1%/year). Real disposable income per capita grows by 1.7%/year.

Oil price cases:

- The benchmark crude oil price in AEO2017 is based on spot prices for North Sea Brent crude oil, which is an international standard for light sweet crude oil. The West Texas Intermediate (WTI) spot price is generally lower than the North Sea Brent price. EIA expects the price spread between Brent and WTI in the Reference, Low Oil Price, and High Oil Price cases to range between $0/barrel (b) and $8/b. Data tables also include WTI prices—a critical reference point for the value of growing production in the U.S. Midcontinent—as well as the imported refiner acquisition cost for crude oil. The December 2015 decision by the U.S. Congress to remove restrictions on U.S. crude oil exports has the potential to narrow the spread between the Brent price and the price of domestic production streams under certain cases involving high levels of U.S. crude oil production.

- The historical record shows substantial variability in oil prices, and there is arguably even more uncertainty about long-term prices. AEO2017 considers three oil price cases (Reference, Low Oil Price, and High Oil Price) to allow an assessment of alternative views on the future course of oil prices.
- The Low and High Oil Price cases reflect a wide range of potential price paths, resulting from variation in global demand and supply of petroleum and other liquid fuels. The Low Oil Price case assumes conditions under which global liquids demand is low and supply is high, while the High Oil Price case assumes the opposite. Both cases illustrate situations in which the shifts in global supply and demand are offsetting, so that liquids consumption is close to Reference case levels, but prices are substantially different.
- In the Reference case, real oil prices (2016 dollars) steadily rise from $43/b in 2016 to $109/b in 2040 and $117/b by 2050. The Reference case represents a trend projection for both oil supply and demand. Global supply increases throughout the projection period. Global oil production is only projected through 2040. Global petroleum and other liquids consumption increases steadily throughout the Reference case, in part because of an increase in the number of vehicles across the world, which is offset somewhat by improvements in light duty vehicle (LDV) and heavy duty vehicle (HDV) fuel economy in developing countries, as well as increased natural gas use for transportation in most regions. Economic growth is steady over the projection period, and there is some substitution away from liquids fuels in the industrial sector.
- In the Low Oil Price case, crude oil prices fall to an average of $25/b (2016 dollars) in 2017, and remain below $50/b through 2050. Relatively low global demand compared to the Reference case occurs as a result of several factors: economic growth that is relatively slow compared to history; reduced consumption in developed countries resulting from the adoption of more efficient technologies, extended CAFE standards, less travel demand, and increased use of natural gas or electricity; efficiency improvement in nonmanufacturing industries in the non-Organization for Economic Cooperation and Development countries; and industrial fuel switching from liquids to natural gas feedstocks for production of methanol and ammonia. Low oil prices also result from lower costs of production and relatively abundant supply from both Organization of the Petroleum Exporting Countries (OPEC) and non-OPEC producers. However, lower-cost supply from OPEC producers eventually begins to crowd out supply from relatively more expensive non-OPEC sources. In the Low Oil Price case, OPEC's market share of liquids production rises steadily from 40% in 2016 to 43% in 2020 and to 48% in 2040.
- In the High Oil Price case, oil prices average about $226/b (2016 dollars) in 2040 and $241/b in 2050. A lack of global investment in the oil sector is the primary cause of higher prices, which eventually leads to higher production from non-OPEC producers relative to the Reference case. Higher prices stimulate increased supply of more costly resources, including tight oil and bitumen, and also lead to significant increases in production of renewable liquid fuels as well as GTL and CTL compared with the Reference case. Increased non-OPEC production, starting in 2019, crowds out OPEC oil, and OPEC's share of world liquids production decreases, from 39% in2016 to under 33% in 2040. The main reason for increased demand in the High Oil Price case is higher economic growth, particularly in developing countries, than in the Reference case. In the developing countries, consumers demand greater personal mobility and more consumption of goods. There are fewer efficiency gains in the industrial sector, while growing demand for fuel in the non-manufacturing sector continues to be met with liquid fuels.

No Clean Power Plan case

- The No CPP case assumes that the CPP is completely vacated and is not enforced, implying that states have no federal requirement to reduce CO2 emissions from existing power plants. There are no constraints imposed in the electricity model to reach regional rate-based or mass-based CO2 targets (other than programs already in place, such as the Regional Greenhouse Gas Initiative [RGGI] in the Northeast and California's SB 32). There is no incentive for incremental energy efficiency in the end-use demand modules.

Oil and gas supply alternative cases:

Oil and Natural Gas Resource and Technology cases

Estimates of technically recoverable tight/shale crude oil and natural gas resources are particularly uncertain and change over time as new information is gained through drilling, production, and technology experimentation. Over the last decade, as more tight/shale formations have gone into production, the estimate of technically recoverable tight oil and shale gas resources has increased. However, these increases in technically recoverable resources embody many assumptions that might not prove to be true over the long term and over the entire tight/shale formation. For example, these resource estimates assume that crude oil and natural gas production rates achieved in a limited portion of the formation are representative of the entire formation, even though neighboring well production rates can vary by as much as a factor of three within the same play. Moreover, the tight/ shale formation can vary significantly across the petroleum basin with respect to depth, thickness, porosity, carbon content, pore pressure, clay content, thermal maturity, and water content. Additionally, technological improvements and innovations may allow development of crude oil and natural gas resources that have not been identified yet, and thus are not included in the Reference case.

The sensitivity of the AEO2017 projections to changes in assumptions regarding domestic crude oil and natural gas resources and technological progress is examined in two cases. These cases do not represent a confidence interval for future domestic oil and natural gas supply, but rather provide a framework to examine the effects of higher and lower domestic supply on energy demand, imports, and prices. Assumptions associated with these cases are described below.

Low Oil and Gas Resource and Technology case

In the Low Oil and Gas Resource and Technology case, the estimated ultimate recovery per tight oil, tight gas, or shale gas well in the United States and undiscovered resources in Alaska and the offshore lower 48 states are assumed to be 50% lower than in the Reference case. Rates of technological improvement that reduce costs and increase productivity in the United States are also 50% lower than in the Reference case. These assumptions increase the per-unit cost of crude oil and natural gas development in the United States. The total unproved technically recoverable resource of crude oil is decreased to 164 billion barrels, and the natural gas resource is decreased to 1,328 trillion cubic feet (Tcf), as compared with unproved resource estimates of 236 billion barrels of crude oil and 1,986 Tcf of natural gas as of January 1, 2015, in the Reference case.

High Oil and Gas Resource and Technology case

In the High Oil and Gas Resource and Technology case, the resource assumptions are adjusted to allow a continued increase in domestic crude oil production, to more than 17 million barrels per day (b/d) in 2040 compared with 11 million b/d in the Reference case. This case includes: (1) 50% higher estimated ultimate recovery per tight oil, tight gas, or shale gas well, as well as additional unidentified tight oil and shale gas resources to reflect the possibility that additional layers or new areas of low-permeability zones will be identified and developed; (2) diminishing returns on the estimated ultimate recovery once drilling levels in a county exceed the number of potential wells assumed in the Reference case to reflect well interference at greater drilling density; (3) 50% higher assumed rates of technological improvement that reduce costs and increase productivity in the United States than in the Reference case; and (4) 50% higher technically recoverable undiscovered resources in Alaska and the offshore lower 48 states than in the Reference case. The total unproved technically recoverable resource of crude oil increases to 355 billion barrels, and the natural gas resource increases to 2,812 Tcf as compared with unproved resource estimates of 236 billion barrels of crude oil and 1,986 Tcf of natural gas in the Reference case as of the start of 2015.

Table 1.1. Summary of AEO2017 cases

Case name	Description
Reference	Real gross domestic product (GDP) grows at an average annual rate of 2.1% from 2016 to 2050. Brent crude oil prices rise to about $117/barrel (b) (2016 dollars) in 2050. Reference case projection tables are in AEO2017 Appendix A.
Low Economic Growth	Real GDP grows at an average annual rate of 1.6% from 2016 to 2050.Energy market assumptions are the same as in the Reference case. Partial projection tables are in AEO2017 Appendix B.
High Economic Growth	Real GDP grows at an average annual rate of 2.6% from 2016 to 2050. Energy market assumptions are the same as in the Reference case. Partial projection tables are in AEO2017 Appendix B.
Low Oil Price	Low prices result from a combination of relatively low demand for petroleum and other liquids in the non-Organization for Economic Cooperative and Development (non-OECD) nations and higher global supply. Lower global demand occurs as a result of several factors: economic growth that is relatively slow compared with history; reduced consumption from the adoption of more efficient technologies, extension of the corporate average fuel economy (CAFE) standards, less travel demand, and increased natural gas or electricity use; efficiency improvement in nonmanufacturing in non-OECD countries; and industrial fuel switching from liquid to natural gas feedstocks for producing methanol and ammonia. On the supply side, both Organization of the Petroleum Exporting Countries (OPEC) and non-OPEC producers face lower costs of production for both crude oil and other liquids production technologies. However, lower-cost supply from OPEC producers eventually begins to crowd out supply from relatively more expensive non-OPEC sources. OPEC's market share of liquids production rises steadily from 40% in 2016 to 43% in 2020 and 48% in 2040. Brent light, sweet crude oil prices fall to an average of $25/b (2016 dollars) in 2017, and remain below $50/b through 2050. Partial projection tables are in AEO2017 Appendix C.
High Oil Price	High prices result from a lack of global investment in the oil sector, eventually inducing higher production from non-OPEC producers relative to the Reference case. Higher prices stimulate increased supply from resources that are more expensive to produce—such as tight oil and bitumen, as well as increased production of renewable and synthetic fuels, compared with the Reference case. Increased non-OPEC production crowds out OPEC oil, and OPEC's share of world liquids production decreases, from 39% in 2016 to 33% by 2040. On the demand side, higher economic growth than in the Reference case, particularly in non-OECD countries, leads to increased demand: non-OECD consumers demand greater personal mobility and consumption of goods. There are also fewer efficiency gains throughout the industrial sector, and growing fuel needs in the nonmanufacturing sector continue to be met with liquid fuels. Crude oil prices are about $226/b (2016 dollars) in 2040 and $241/b in 2050. Partial projection tables are in AEO2017 Appendix C.

Table 1.1. Summary of AEO2017 cases (cont.)

Case name	Description
Oil and Gas: Low Oil and Gas Resource and Technology	Estimated ultimate recovery per shale gas, tight gas, and tight oil well in the United States and undiscovered resources in Alaska and the offshore lower 48 states are 50% lower than in the Reference case. Rates of technological improvement that reduce costs and increase productivity in the United States are also 50% lower than in the Reference case. All other assumptions remain the same as in the Reference case. Partial projection tables are in AEO2017 Appendix D.
Oil and Gas: High Oil and Gas Resource and Technology	Estimated ultimate recovery per shale gas, tight gas, and tight oil well in the United States, and undiscovered resources in Alaska and the offshore lower 48 states, are 50% higher than in the Reference case. Rates of technological improvement that reduce costs and increase productivity in the United States are also 50% higher than in the Reference case. In addition, tight oil and shale gas resources are added to reflect new plays or the expansion of known plays. All other assumptions remain the same as in the Reference case. Partial projection tables are in AEO2017 Appendix D.
Electricity: No CPP	Assumes that the CPP is not enforced, and that no federal requirements are in place to reduce CO2 emissions from existing power plants.

MICHIGAN PUBLIC SERVICE COMMISSION
Staff
Portfolio Expected Value and Economic Risk Comparison.

Case No.: U-18419
Exhibit S-2.7
Witness: Olumide O. Makinde
Page: 1 of 1
Date: January 12, 2018

Line No.	(a)	(b) Expected Value	(c) Economic Risk	(d)	(e)	(f)	(g)	(h)
	Portfolio 1: Recommended build	$ 57,676,520.04	$ 97,238,808.79	Source KJC-319				
1	Portfolio 2: Wind	$ 58,289,679.81	$ 97,617,438.07	Source KJC-319				
2	Portfolio 3: Solar	$ 58,270,378.17	$ 97,881,620.33	Source KJC-319				
3	Portfolio 4: Demand response	$ 57,816,943.06	$ 97,252,917.55	Source KJC-319				
4								
5				**Expected value difference**				
6	Portfolio 1 vs.Portfoilo 2	$ (58,289,679.81)	Portfolio 2 vs.Portfoilo 1	$ 613,159.77	Portfolio 3 vs.Portfoilo 1	$ 593,858.12	Portfolio 4 vs.Portfoilo 1	$ 140,423.02
7	Portfolio 1 vs.Portfoilo 3	$ (58,270,378.17)	Portfolio 2 vs.Portfoilo 3	$ 19,301.65	Portfolio 3 vs.Portfoilo 2	$ (19,301.65)	Portfolio 4 vs.Portfoilo 2	$ (472,736.75)
8	Portfolio 1 vs.Portfoilo 4	$ (57,816,943.06)	Portfolio 2 vs.Portfoilo 4	$ 472,736.75	Portfolio 3 vs.Portfoilo 4	$ 453,435.10	Portfolio 4 vs.Portfoilo 3	$ (453,435.10)
9	Average	$ (58,125,667.01)		$ 368,399.39		$ 342,663.86		$ (261,916.28)
10				**Economic Risk Difference**				
11	Portfolio 1 vs.Portfoilo 2	$ (97,617,438.07)	Portfolio 2 vs.Portfoilo 1	$ 378,629.28	Portfolio 3 vs.Portfoilo 1	$ 642,811.54	Portfolio 4 vs.Portfoilo 1	$ 14,108.75
12	Portfolio 1 vs.Portfoilo 3	$ (97,881,620.33)	Portfolio 2 vs.Portfoilo 3	$ (264,182.27)	Portfolio 3 vs.Portfoilo 2	$ 264,182.27	Portfolio 4 vs.Portfoilo 2	$ (364,520.52)
13	Portfolio 1 vs.Portfoilo 4	$ (97,252,917.55)	Portfolio 2 vs.Portfoilo 4	$ 364,520.52	Portfolio 3 vs.Portfoilo 4	$ 628,702.79	Portfolio 4 vs.Portfoilo 3	$ (628,702.79)
14	Average	$ (97,583,991.98)		$ 159,655.84		$ 511,898.86		$ (326,371.52)

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

* * * *

In the matter of the Application of **DTE ELECTRIC COMPANY** for approval of Certificates of Necessity pursuant to MCL 460.6s, as amended, in connection with the addition of a natural gas combined cycle generating facility to its generation fleet and for related accounting and ratemaking authorizations.	))))))))	Case No. U-18419

QUALIFICATIONS AND DIRECT TESTIMONY OF

KAREN M. GOULD

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

QUALIFICATIONS OF KAREN M. GOULD
CASE NUMBER U- 18419
PART I

Q. Please state your full name, business address and occupation.

A. My name is Karen M. Gould, and my business address is 7109 W. Saginaw, Lansing, MI 48917. I am employed by the Michigan Public Service Commission (MPSC or Commission) as an Auditor in the Energy Waste Reduction Section of the Electric Reliability Division.

Q. Describe your education and professional background.

A. I graduated from Davenport University with a Bachelor's of Science degree in Accounting. I commenced employment with the Commission in 2006. From 2006 until 2009 I was charged with auditing the expenditures of the Low-Income Energy Efficiency Fund (LIEEF). Projects included the selection of grantees, audits of each individual grantee who was awarded funding through the LIEEF program, and payment processing. In 2009, I began my current position working for the Energy Waste Reduction section (formerly Energy Optimization) as the financial auditor of the Energy Waste Reduction (EWR) program expenditures. In this position I am responsible for the auditing of rate regulated utilities annual reconciliation of their EWR program expenses and annual reports. I also work on the review of utility plan filings for their Energy Waste Reduction biennial plans and amendments. In this position I have taken on several special projects such as grant administrator of the Michigan Saves Energy Efficiency Financing program. From 2009 through present I have annually attended the Institute of Public Utilities Regulatory Studies Program. The course work is designed specifically and exclusively to meet the needs of public-sector regulatory professionals. Also, in 2009, I spent a week in Nigeria with the Nigerian Electricity Regulatory Commission through NARUC where I prepared and presented sessions to the Nigerian Federal Electricity Regulatory

Commission Staff on the topics of 2008 Public Act 295 (PA 295) and other regulated energy issues. In September of 2009, I attended Building Financial Institute's Building Analyst Training. This was a comprehensive home energy assessment with coursework in building envelope evaluation, thermal and pressure boundaries, air sealing and building airflow standards and calculations. From 2009-2011, I was the Chair of the EO Evaluation Collaborative Workgroup. This Collaborative, created in Case No. U-15805 et al., consisted of all electric and natural gas utilities subject to the MPSC's jurisdiction under PA 295, as well as State-wide participation of non-profit organizations, environmental groups, and other State of Michigan government departments. In April of 2017, PA 295 was amended by Public Act 342 (PA 342) which continues the requirements for energy efficiency programs with specific savings targets by all electric and gas utilities in Michigan. In 2017 I have been collaborating with Staff to address the plug-in electric vehicle effort. In December of 2017, I was assigned to serve as Acting Manager of the EWR Section.

Q. Have you ever testified before the Michigan Public Service Commission?

A. Yes, I have testified in the following cases:

Case No. U-15806	DTE – Electric Plan Amendment
Case No. U-15890	DTE – Gas EO Plan Amendment
Case No. U-16412	Consumers Energy EO Plan Amendment
Case No. U-17049	DTE – Gas EO Plan Amendment
Case No. U-17050	DTE – Electric EO Plan Amendment
Case No. U-17138	Consumers Energy EO Plan Amendment
Case No. U-18261	Consumers Energy EWR Plan Filing

1	Case No. U-18263	Indiana Michigan Electric Co. EWR Plan Filing
2	Case No. U-18270	SEMCO Gas Company EWR Plan Filing
3	Case No. U-18333	Indiana Michigan Electric Co. EO Reconciliation
4	Case No. U-18262	DTE – Electric EWR Plan Filing
5	Case No. U-18268	DTE – Gas EWR Plan Filing

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to provide recommendations regarding the proposed Energy Waste Reduction (EWR) implementation in DTE – Electric Company's (the Company) Certificate of Necessity case, pursuant to Sec 6(s)11(d).

Q. Are you sponsoring any exhibits in this proceeding?

A. Yes, I am sponsoring the following exhibits which were prepared by me:

Exhibit KMG-1 (S-3.1)	Company Witness K.J. Chreston Discovery Response
Exhibit KMG-2 (S-3.2)	Excerpts from the Michigan Lower Peninsula Electric Potential Study, Final Report, August 11, 2017, by GDS Associates, Inc.[1], Page 90
Exhibit KMG-3 (S-3.3)	Company Witness K.L. Bilyeu Discovery Response

Q. How does the Company treat EWR, or energy efficiency, in this case as it pertains to the level of implementation for meeting their energy and capacity needs?

A. As testified by Witness I.M. Dimitry, on page IMD-20, lines 3-9, "After taking into account planned renewables, energy efficiency, and demand response programs, the results of the IRP process that, in the majority of the cases modeled, the Company's expected shortfall in energy and capacity would most prudently be addressed with the addition of a base-load combined cycle gas turbine generating plant sized at approximately 1,100 MW with demand response and minor market purchases or other resources up to 300 MW being used to make up any remaining energy and capacity needs." The use of the word "planned" for renewables, energy efficiency, and demand

[1] Full report can be found here: LP Combined Utility BAU Potential w/ Additional Aggressive Program Scenarios

response, alludes that the levels of these energy resources were calculated prior to inputting them into the modelling.

Q. Are there other examples of how the Company inadequately assessed EWR for the purposes of this filing?

A. Through discovery, attached as KMG-1 (S-3.1), Staff questioned the Company's reference to energy efficiency because different witnesses define energy efficiency as a demand side resource and a supply side resource. Witness Chreston replies to this discovery question by stating, "Energy efficiency programs are considered demand side resources. The programs were modeled as a supply side resource to compare against other supply side alternatives on the same basis." But as I explained in my previous response, that assertion is incorrect. Under the company's approach, energy efficiency was never truly assessed to the maximum potential in consideration for addressing the Company's expected shortfall in energy and capacity. EWR can, and should be, considered a supply-side resource when modelling for energy and capacity needs. This would allow EWR to be optimally accounted for, and structured to produce the most cost-effective levels for planning purposes. Energy efficiency programs and measures have proven to provide increased reliability to utility providers in meeting their energy and capacity needs, while simultaneously providing stability and assurance to Michigan utility customer's energy needs.

Q. Did the Company adequately model and consider EWR program savings in excess of the 1.5% annual savings?

A. No. The Company modeled EWR programs savings levels at 2.0% annual EWR savings in the 2.0% Energy Efficiency Sensitivity, but discarded that level of EWR savings from

final consideration in the 2017 Reference Scenario. One of the reasons for the elimination of 2.0 % EWR savings, is the minor difference in NPV of the 2.0% EWR sensitivity compared to the 1.5% EWR sensitivity. On page 44 of Company Witness KJC testimony, Figure 4 shows that the 2.0% EWR has an NPV that is $1,020 million less than the reference case, while the 1.5% EE sensitivity has an NPB that is $1,028 million less than the reference case. This distinction is minimal for purposes of modeling EWR. Increased EWR would also produce additional economic benefits in the form of reduced dollars leaving the state for fuel imports. There would also be direct environmental benefits in the form of reduced air emissions from fossil generation, and reduced risk of future costs associated with carbon emissions. Those benefits are not reflected in the NPV values shown, but should not be ignored. In addition, 2.0% EWR was excluded in the High Gas Price Scenario, where EWR is even more cost effective.

Q. Does Staff believe the Company is capable of providing more energy efficiency opportunities for its customers than they are projecting in this filing?

A. Yes. For this filing, the Company considered program offerings at the 2.0%, 1.5%, 1.0%, and <1.0% levels. According to the ACEEE 2017 State Energy Efficiency Scorecard[2], many states have experience administering EE programs which meet and exceed annual savings of 1.5%, and in fact, and in fact, six states are planning to meet or exceed 2.0% annual saving targets in their most recent multi-year plans. In lieu of the Company's potential study results, alongside the results of the updated Michigan Lower Peninsula Electric Energy Efficiency Potential Study[3], specifically page 90, presented as Exhibit

[2] The 2017 State Energy Efficiency Scorecard
[3] Michigan Lower Peninsula Electric Energy Efficiency Potential Study

KMG-2 (S-3.2), prepared by GDS Associates, Inc. in August of 2017, the Company could cost effectively achieve savings levels equivalent to 2% or more of annual retail sales through 2026, and possibly longer.

Q. How does the Michigan Lower Peninsula Electric Energy Efficiency Potential Study characterize the EWR potential?

A. The study results characterize EWR potential as Technically Achievable, Economically Achievable, and Achievable. The technical potential results state all the potential energy efficiency which could be implemented if measures and programs did not need to meet cost effectiveness and most or all customers have a willingness to adopt the measures. The economic potential results take into account the cost effectiveness of measures and programs, but ignores market barriers and programming costs. The achievable results will display a realistic energy savings potential which assumes cost effectiveness, a penetrable market, etc. It is the most conservative and predictable result. Not all categories take into consideration cost effectiveness based on the Utility Resource Cost Test (URCT, or UCT) as required by Act 342. Potential study results consider energy efficiency measure lives, measure savings and costs, the net present value of future savings, penetration rates for energy efficiency measures, avoided costs, and future changes to codes and standards for buildings and equipment. Unfortunately, it is very difficult to value the non-monetary benefits of energy efficiency such as customer comfort and safety, lower energy bills, and carbon emissions, just to name a few. So, while evaluating the results of this study, energy efficiency is undervalued in those terms. Also, customer participation could occur at a greater rate than calculated in this study due to those non-monetary benefits.

Q. Which type of EWR potential does the Company consider in their planning process?

A. The Company relies on the achievable potential results calculated for their independent energy efficiency potential study conducted in 2016, also by GDS Associates, Inc.

Q. What evidence does Staff take into consideration for recommendation of a greater energy savings target than proposed by the Company?

A. The referenced updated potential study combined the results of the separate potential studies for Consumers Energy and DTE Electric Company, by GDS Associates, Inc. in 2016. It was then updated with the most current values and assumptions that may not have been available when those studies were originally conducted. The study was then taken one step further by incorporating different optimized, but conceivable scenarios which resulted in higher potential.

Q. What were the findings of the savings levels with the more optimized, aggressive scenarios?

A. The combined updated potential study relies on a 50% rebate for the incremental cost to upgrade. What this means is if a customer is purchasing an eligible energy measure, and upgrading to a more energy efficient model or version of that measure would cost $100, the utility would then offer that customer $50 to upgrade, leaving the balance of $50 to be paid for by the customer. Incorporating the alternative, optimal scenario showed that increased incentives proved that EWR energy savings levels could be increased to 2.0% in 2018 and ramps up to 2.8% in 2025. Because spending and collection caps were removed by the amended Act 342, these results prove more energy efficiency can be done while still remaining extremely cost effective as required by the Legislation. In conclusion, multiple aspects of the Company's EWR programming can be slightly changed or optimized to cost-effectively reach greater savings.

Q. What is the Company proposing for their EWR programming implementation relating to this application?

A. The Company is proposing to implement EWR programs and measures which will produce annual savings of 1.5% of their previous year's annual sales through 2021.

Q. What is the EWR legislative requirement for the Company?

A. According to Public Act 295 (PA 295) as amended by Public Act 342 (PA 342), the Company is required to achieve annual savings equal to 1% of the Company's previous year's sales.

Q. Would you agree that the Company is proposing to implement EWR programs in excess of the requirements of PA 342?

A. Yes. Public Act 342 requires utilities to achieve a minimum of 1% annual savings, but the Act also allows for the potential of an awarded financial incentive payment based on the Company exceeding that target by 0.5%, at a minimum. The Company is proposing to achieve an energy savings level of 1.5%, which allows them to reach the legislative requirement, and meet base eligibility for the maximum incentive payment allowed by the Act.

Q. What does the Act allow for a maximum incentive payment?

A. Act 295, which had offered a maximum incentive of 15% of EWR program spend, was amended by Act 342, which now offers the potential to earn up to 20% of total program spend. Specifically, the Act states that the Commission may award the Company a financial incentive payment of the lesser of 30% of the net present value of life-cycle cost reductions experienced by their customers, or 20% of the Company's actual EWR

program expenditures for the year. All PA 295 era financial incentives have been awarded based upon the percentage of program expenditures for the year.

Q. What is the intent of a financial incentive mechanism, and subsequent financial incentive award?

A. A constructive financial incentive mechanism is devised to compensate the Company for the potential reduced opportunity for the provider to invest in utility infrastructure. PA 295, as amended by PA 342, identifies energy waste reduction programs as being designed to reduce the future cost of service to customers, to delay the need to construct new electric generating facilities, and to protect customers from incurring the costs of construction. The incentive structure should balance the risks and rewards in a way that provides a greater opportunity to earn its maximum incentive with a more balanced portfolio. Utility providers that offer EWR programs which are in excess of the legislative required savings, and which also provide programs and measures that allow their customers to realize the important and more robust monetary and non-monetary benefits of EWR now and into future years, are deserving of consideration for a financial incentive payment.

Q. Has the Company been awarded financial incentive payments in the past?

A. Yes, the Company has been able to successfully implement EWR programs since 2009, which met and exceeded the requirements for the maximum financial incentive award. The awards for the Company, to date, are listed below:

Program Year	DTE Energy - Electric	DTE Energy - Gas	Total
2009	$3,008,829	$913,374	3,922,203
2010	$6,200,000	$2,400,000	8,600,000
2011	$8,400,000	$3,400,000	11,800,000
2012	$10,400,000	$4,300,000	14,700,000
2013	$10,562,411	$3,848,020	14,410,431
2014	$12,716,895	$3,617,094	16,333,989
2015	$13,100,000	$3,600,000	16,700,000
2016*	$13,300,000	$3,700,000	17,000,000
Total	$77,688,135	$25,778,488	103,466,623

*anticipated

Q. Why did the Company choose to implement EWR programs at a level of 1.5%?

A. It is explained in Witness Bilyeu's testimony, on page KLB-21, lines 11-18, that the 1.5% savings level allows the Company to maintain a consistent spend and energy savings. He also explains that it would be "administratively burdensome to ramp programs up for a short period of time and then ramp back down." He then goes on to explain on the same page, lines 17-18, that "fluctuation in programs may result in poor trade ally, vendor, and customer satisfaction." And, as mentioned earlier, the Company considers the slightly higher cost effectiveness values to be significant.

Q. Does Staff believe these are valid reasons to rely on a 1.5% energy savings target rather than a 2% energy savings target?

A. No. Staff adamantly believes that the benefits realized by trade allies, vendors and the Company's customers at a rate of 2% energy savings would be most prudent. As stated in Witness Bilyeu's Discovery Response STDE-6.19, presented as Exhibit KMG-3 (S-3.3), "Since both the 1.50% and 2.00% sensitivities capture the entire energy efficiency potential by 2030, just at a slightly different rate, customers may realize most of the same benefits in the 1.50% sensitivity as the 2.00% sensitivity. Moreover, the 1.50% energy

savings sensitivity delivers those benefits with greater cost-effectiveness while being administratively achievable." If this statement is true, and you compare the costs associated with implementing 1.5% energy savings as opposed to 2.0% energy savings, as found in the direct testimony of Kevin Bilyeu (KLB-20) Table 9, delivering the 2% energy savings is cheaper than the 1.5% level. This chart shows a 20-year total for 1.5% savings level achieved at a cost of $1,493 MM, as opposed to delivering the savings at the 2.0% level from 2018 to 2020 at a cost of $1,427 MM. It is evidently more prudent to allow its vendors and their customers to realize the benefits of EWR sooner rather than later. The economic benefits of EWR along with savings from lower usage, energy security, and comfort and safety for customers are appreciable betterments which Staff accredits to higher EWR savings for the Company's service territory.

Q. What are the cost effectiveness scores provided by the Company?

A. For EWR programs to be considered cost effective, the programs and measures must calculate to a score of 1.0 or higher, which indicates that benefits must be equal to or greater than the costs. A score of 1.0 means the benefits equal the costs. A score of 2.0 means the benefits are 2 times greater than the costs. The Company testifies the cost benefit result for 1.5% energy savings is 8.13 as opposed to the cost benefit result for 2.0% energy savings of 7.95. Staff does not accredit this minimal difference as justification to keep savings level at 1.5% when 2.0% would prove to be much more beneficial to their customers while still achieving a very high cost effectiveness score in which the benefits are nearly 8 times greater than the costs.

Q. Does Staff believe that ramping up to an energy savings level of 2.0% could in fact be administratively burdensome, and that it may also be burdensome should the Company have to ramp back down to 1.5%?

A. No. During Case No. U-17762, DTE Electric Company's Amended Energy Optimization Plan, Staff saw that when Act 342 came into effect on April 20, 2017, the Company was able to demonstrate that they would be able to ramp up from the previous energy savings level of 1.15% to 1.5% while maintaining the same approved spending level. Staff has confidence the Company is capable of achieving this mid-year increase of 31%, along with the anticipated 1.5% savings projected in 2018-2019, with minimal burden to their trade allies, vendors, and customers. Additional EWR benefits realized by vendors, trade allies and customers of the Company greatly outweigh the possible administrative burden to the Company.

Q. Is there merit in keeping spending and savings levelized over the near future?

A. No. Although the Company believes remaining levelized would relieve administrative burden, the benefits realized by the vendors, trade allies, and customers, along with the additional risk reduction and energy security for Michigan's resources, seems most reasonable and prudent until another energy efficiency potential study is conducted that proves Michigan's building stock is reaching saturation levels. Witness Bilyeu states in his testimony on page KLB-22, line 25 that savings levels beyond 2024 may become more challenging. He goes on to list a few of these challenges on the following page, KLB-23. Staff holds firm in its beliefs that while there may be challenges in the EWR arena, there will also be many solutions to those challenges that arise by that time. Market barriers that occur today such as capturing the hard-to-reach segments, or making

customers more energy-conscious have only improved over the past 10 years. Staff predicts that trend will continue through customer education and awareness. The more knowledgeable Michigan residents and businesses become on their energy usage and the possible savings associated with EWR measures and programs, the more they will attempt to improve their home's and building's energy health. That, along with new technologies in programming and measures, will ensure there will always be a place for EWR in Michigan's energy plans.

Q. Does Staff believe the Company could eliminate the need to build a new generating facility?

A. Staff acknowledges that EWR will not replace the 1100+ MW electric generating facility build requested in this filing, but even nominal increases of EWR provide security and stability for the Company in meeting the energy needs of their customers. EWR implemented now will delay, mitigate, or reduce future costs encumbered by the Company's customers. For these reasons, Staff believes that all cost effective EWR program and measures offerings should be actively and aggressively pursued by the Company for their customers. Any incremental amount of EWR, renewable energy, and demand response programs would most likely decrease the size of the generating facility, or delay the building of a generating facility. See Witness Harlow and Witness Smith's testimony for Staff's recommendations on renewable energy and demand response.

Q. Does Staff have any other thoughts regarding EWR and how it relates to this filing?

A. As explained earlier, the Company's purported IRP analysis for this case was seriously deficient in its assessment of the EWR resource. Recognizing the time delay that would be required to fix that problem and conduct a full and proper analysis, Staff is proposing

a pragmatic approach: that as a condition of approval for the requested certificate of need for the large baseload natural gas generating plant, the Company implement the 2% annual savings path for EWR, for the 2019 to 2021 time period. Staff reiterates the importance of providing any and all cost effective EWR measures and programs to their customers. EWR can not only delay the need to build future new generating facility, but could help reduce the amount of future energy and generating capacity needed. In addition to other benefits mentioned above, EWR also provides benefits such as providing monetary relief for customer's bills, comfort, added safety in buildings and homes, and security and reliability for Michigan's electric infrastructure. The Company's customers, and the state of Michigan, will be incurring substantial obligations and risk if the Company is provided with a certificate of need for their requested natural gas generating plant. It seems only reasonable that those customers and the state should not be deprived of the benefits of a stronger implementation of the EWR resource, which were precluded by the Company's deficient IRP analysis. For these reasons, and because EWR will assist the management of the state's electric supply requirements, Staff recommends the Company include EWR at a level of at least 2%, along with adequate levels of renewable energy and demand response as a viable supply-side resource.

Q. Does this conclude your testimony?

A. Yes.

S T A T E OF M I C H I G A N

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

* * * *

In the matter of the Application of **DTE ELECTRIC COMPANY** for approval of Certificates of Necessity pursuant to MCL 460.6s, as amended, in connection with the addition of a natural gas combined cycle generating facility to its generation fleet and for related accounting and ratemaking authorizations.	))))))))	Case No. U-18419

EXHIBITS OF

KAREN M. GOULD

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

MPSC Case No.: U-18419
Respondent: K. J. Chreston
Requestor: STAFF
Question No.: STDE-6.7
Page: 1 of 1

Question: On page IMD-14, witness Dimitry states on line 19, "In addition to supply side resources, the Company plans to continue investing in energy efficiency and demand response programs, which ultimately reduce customer usage and the overall demand the Company is required to serve." This statement alludes to the fact that the Company did not consider EWR a supply side resource. Yet, on page CFS-12, line 8, witness Adkins states, "All the Company's Energy Efficiency resources are represented as supply-side transactions." Please clarify whether Energy Efficiency was considered a supply-side resource, or a demand-side resource for planning purposes of this case.

Answer: Energy efficiency programs are considered demand side resources. The programs were modeled as a supply side resource to compare against other supply side alternatives on the same basis.

TABLE 9-2 provides the cumulative annual savings in MWh, and as a percent of the combined DTE Energy and Consumers Energy sales forecast, for 2017 through 2036. In the initial year savings (as a % of forecast sales) ranges from 1.7% to 2.3% between the base case and three sensitivity scenarios. By 2036, the final year in the analysis timeframe, savings range between 20.4% and 30.7% of forecast sales. More detailed tables of the scenario results of energy savings and summer peak demand savings relative to the base case are available in Appendix H.

TABLE 9-2. CUMULATIVE ANNUAL MWH SAVINGS OF SENSITIVITY SCENARIOS ON THE LOWER PENINSULA

Year	Base Case		100% Incentives Scenario		High Assumptions Scenario		Carbon Price Scenario	
	MWh Savings	% of Sales	MWh Savings	% of Sales	MWh Savings	% of Sales	MWh Savings	% of Sales
2017	1,391,028	1.7%	1,532,109	1.8%	1,932,599	2.3%	1,444,575	1.7%
2018	2,682,902	3.2%	2,986,467	3.5%	3,768,876	4.4%	2,790,123	3.3%
2019	4,003,165	4.7%	4,490,301	5.3%	5,674,931	6.6%	4,164,224	4.9%
2020	5,351,144	6.2%	6,042,348	7.0%	7,637,831	8.9%	5,566,202	6.5%
2021	6,215,155	7.2%	7,054,179	8.2%	8,971,964	10.4%	6,483,908	7.5%
2022	7,504,319	8.6%	8,557,403	9.9%	10,884,551	12.5%	7,826,871	9.0%
2023	8,811,273	10.1%	10,092,954	11.6%	12,835,900	14.8%	9,187,576	10.6%
2024	10,140,200	11.6%	11,664,380	13.4%	14,830,174	17.0%	10,570,518	12.1%
2025	11,462,574	13.1%	13,240,114	15.1%	16,829,445	19.2%	11,946,767	13.7%
2026	12,709,772	14.4%	14,736,486	16.8%	18,730,855	21.3%	13,248,145	15.1%
2027	13,535,931	15.4%	15,774,761	17.9%	20,078,758	22.8%	14,122,332	16.0%
2028	14,250,320	16.1%	16,640,348	18.9%	21,194,836	24.0%	14,885,623	16.9%
2029	14,914,909	16.9%	17,440,578	19.7%	22,246,052	25.1%	15,599,590	17.6%
2030	15,528,081	17.5%	18,177,175	20.5%	23,229,014	26.2%	16,262,276	18.3%
2031	16,114,423	18.1%	18,873,893	21.2%	24,165,146	27.2%	16,898,407	19.0%
2032	16,619,226	18.6%	19,470,370	21.8%	24,967,839	28.0%	17,445,374	19.6%
2033	17,091,592	19.1%	20,019,945	22.4%	25,712,342	28.7%	17,959,505	20.1%
2034	17,538,467	19.5%	20,529,747	22.8%	26,407,338	29.3%	18,447,789	20.5%
2035	18,007,229	20.0%	21,059,207	23.3%	27,116,971	30.1%	18,957,935	21.0%
2036	18,462,268	20.4%	21,568,920	23.8%	27,799,901	30.7%	19,453,914	21.5%

TABLE 9-3 provides the statewide budgets for the Lower Peninsula base case and three sensitivity scenarios. The average annual costs over the 2017-2036 analysis timeframe in the base case (50% incentives) scenario is approximately $380 million dollars. In the 100% incentives scenario, average annual spending is estimated to increase to nearly $560 million per year. In the high assumptions scenario, the increase in incentives, low-income measures, and long-term market adoption rates result in average annual budgets of nearly $985 million. Conversely, the carbon price scenario did not alter the 50% incentive assumption and budget increases are the result of additional cost-effective measures only. The average annual spending in the carbon price scenario is approximately $428 million per year.

MPSC Case No.: U-18419
Respondent: K. L. Bilyeu
Requestor: STAFF
Question No.: STDE-6.19
Page: 1 of 1

Question: Does the Company agree that EWR program offerings at a rate of 2% per year for the next 5 years would allow its customers to realize all, if not most of, the benefits listed in question 19, and also stated on witness Bilyeu's testimony, page KLB-6, line 15? If not, why not?

Answer: No. Since both the 1.50% and 2.00% sensitivities capture the entire energy efficiency potential by 2030, just at a slightly different rate, customers may realize most of the same benefits in the 1.50% sensitivity as the 2.00% sensitivity. Moreover, the 1.50% energy savings sensitivity delivers those benefits with greater cost-effectiveness while being administratively achievable.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

* * * *

In the matter of the Application of **DTE ELECTRIC COMPANY** for approval of Certificates of Necessity pursuant to MCL 460/6s, as amended, in connection with the addition of a natural gas combined cycle generating facility to its generation fleet and for related accounting and ratemaking authorizations.	)))))))))	Case No. U-18419

QUALIFICATIONS AND DIRECT TESTIMONY OF

KATIE J. SMITH

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

QUALIFICATIONS OF KATIE J. SMITH
CASE NUMBER U-18419
PART I

Q. Please state your name, business address and occupation for the record.

A. My name is Katie J. Smith and my business address is 7109 W. Saginaw Highway, Lansing, MI 48917. I am employed by the Michigan Public Service Commission (MPSC) as an Economic Analyst in the Energy Waste Reduction (EWR) Section of the Electric Reliability Division.

Q. Please describe your educational background.

A. I earned a dual Bachelor's degree in Finance and Economics from Lake Superior State University.

Q. What is your work experience?

A. I worked for the Eastern Upper Peninsula Intermediate School District from 2006 to 2009 where I conducted data analysis and data processing of the Michigan Educational Assessment Program (MEAP) as well as with a number of other standardized tests. In August of 2009 I began employment with the MPSC as an Economic Analyst working in the Energy Efficiency Section, currently Energy Waste Reduction Section.

Q. What does your work at the MPSC consist of?

A. As an Economic Analyst working in the EWR section, I review filings made in utility Energy Waste Reduction plans and reconciliations. I also examine issues and make recommendations relating to Revenue Decoupling and Demand Response. I currently manage the integration of EWR credits into the existing MIRECS system. I am also a member of the internal team working with EGEAS and AURORA resource adequacy models.

QUALIFICATIONS OF KATIE J. SMITH
CASE NUMBER U-18419
PART I

Q. Have you previously filed testimony in proceedings before the Commission?

A. Yes. I have provided testimony in the following cases:

Case No.	Description
U-16180	Revenue Decoupling
U-16289	EO Plan Financial Incentive
U-16358	EO Plan Financial Incentive
U-16169	Revenue Decoupling
U-16472	Revenue Decoupling
U-16566	Revenue Decoupling
U-16670	EO Plan Surcharge Clarification
U-16568	Revenue Decoupling
U-16794	Revenue Decoupling
U-16730	EO Plan Gas Transportation
U-16855	Revenue Decoupling
U-16999	Revenue Decoupling
U-17603	EO Plan Revenue Decoupling
U-17771	EWR Plan
U-18270	EWR Plan
U-18333	EWR Reconciliation
U-18370	Revenue Decoupling
U-18263	EWR Plan

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to present Staff's recommendations regarding the projected demand response (DR) resources and programs as proposed by DTE Electric Company's (the Company) Certificate of Necessity Filing, as required under Section 6(t)11(e).

Q. Are you sponsoring any exhibits in this case?

A. Yes. I am sponsoring the following exhibits which were prepared by me.

Exhibits	Description
Exhibit S-4.1	Discovery Response Demand Response Participation
Exhibit S-4.2	Discovery Response Participation and Tariff Cap
Exhibit S-4.3	Discovery Response Tariff Caps

Q. What are the Company's current capacity values for DR resources?

A. As stated in Derek D. Kirchner's Direct Testimony on Page 6 lines 8 and 9, the Company has 572 MW of qualified resources and receives a planning credit of 630 MW in the MISO capacity auction.

Q. Does the company have future capacity values for DR resources to be obtained?

A. Yes, as stated in Derek D. Kirchner's Direct Testimony on Page 9 lines 11-13, the Company is expecting to be able to add an additional 125 MW of capacity using planned demand side management program repairs to interruptible air conditioning (IAC) switches.

Q. Is the Company planning to expand participation in existing DR programs to meet capacity needs?

A. No, Exhibit S-4.1 shows that the Company is only seeking to repair the switches for customer meters already enrolled in the IAC program and is not currently seeking to increase participation.

Q. Is the Company forecasting growth in capacity through their current programs?

A. As shown in Exhibit S-4.2, the Company is not forecasting growth in capacity through these programs due to either an inability given the tariff cap or, the lack of customer interest.

Q. Is the tariff cap – which sets the maximum number of program participants - mentioned by the Company self-imposed?

A. Yes. In Exhibit S-4.3 the Company indicates the caps on the tariffs were requested by the Company.

Q. Does Staff believe that the tariff caps could be adjusted to allow more participation?

A Yes. Staff is not aware of any cost of service study or analysis which supports capping participation in an IAC program.

Q. Has the Company requested in rate cases before the commission, to invest in more DR programing?

A. Yes, in Case U-18014, the Company has been approved for a dynamic peak pricing program (DPP) to invest in 10,000 thermostats, and has requested in the current rate case no. U-18255 an additional 15,000 thermostats.

Q. What was the Staff's response to the new request?

A. Staff made it clear in U-18255 that the Company must first implement what they were approved for in U-18014 before asking for additional investment for thermostats in their

DPP program. The Company has the potential already to increase DR savings but has not implemented their approved programs.

Q. Has the Company compared their DR resource capacity values to any potential studies?

A. Yes, the Company stated they compared their proposed plans for Demand Side Management (DSM) to their most recent potential study, completed by GDS Associates, Inc., for the Company.

Q. What was the Company's result of this comparison?

A. On page 10 lines 13-17 Company witness Derek D. Kirchner stated:

> "The Company's proposed DSM programs total 572 MW of existing capacity in 2017 with projected growth of the DSM programs to 697 MW by 2021. The GDS Associates study provided an achievable potential of 845 MW by 2020 in their Smart Thermostat scenario for all available DR programs. The current Demand Side Management plan for the Company is in-line with the suggested achievable potential."

Q. Does Staff believe the Company is in-line with the suggested achievable potential as the Company stated in Mr. Kirchner's testimony?

A. No. Staff believes the Company is attempting to ramp up their DR programs from 572 MW in 2017 to 697 MW by 2021. However, the Company will fall short of the GDS potential study results of 845 MW by 2020 if the Company does not take more initiative and apply more effort toward these programs. This is a difference of a potential 148 MW.

Q. Has the Commission conducted its own DR potential study?

A. Yes, pursuant to Act 341 of 2016, the commission was required to conduct a statewide potential study. Section 6t. (1)(b) states:

> *"Conduct an assessment for the use of demand response programs in this state, based on what is economically and technologically feasible, as well as what is reasonably achievable. The assessment shall expressly account for advanced metering infrastructure*

that has already been installed in this state and seek to fully maximize potential benefits to ratepayers in lowering utility bills."

In September of 2017, the MPSC issued a State of Michigan Demand Response Potential Study, by Applied Energy Group (AEG)[1].

Q. What was the outcome of the statewide potential study?

A. As shown on page 46, the technical assessment of the statewide potential at the achievable low level[2] for the state is an incremental 991 MW by 2020 with the percent of baseline being a minimum of 4.4% by 2020.

Q. What would be the estimated potential for the Company in 2020 using the statewide potential study?

A. DTE accounts for roughly 39%[3] of the state's electrical supply, so a calculation of 39% of the 991 MW by 2020 for the achievable low level for the Company would equate to 386 MW. In other words, the Company has potential in 2020 to achieve 386 MW above their baseline. The potential study's minimum 4.4% of baseline could also be used to incrementally compute the Company's potential if calculated against the company's load forecast for this case.

Q. Based on the AEG statewide potential study results what is staff's recommendation for DR potential for DTE?

[1] http://www.michigan.gov/documents/mpsc/State_of_Michigan_-_Demand_Response_Potential_Report_-_Final_29sep2017__602435_7.pdf

[2] The State of Michigan 2017 DR potential study defines realistic achievable potential as only considering cost-effective programs. In addition, the integrated case accounts for participation in multiple programs and eliminates double counting. The study developed two levels of achievable potential. Realistic 1.) Achievable Potential – Integrated Low Case. The low case uses input assumptions that have lower participation rates, lower penetrations of enabling technology, lower costs, and opt-in rate programs. 2.) Realistic Achievable Potential – Integrated High Case. The high case uses input assumptions that have higher participation rates, higher penetrations of enabling technology, higher costs, and opt-out rate programs. (page 44)

[3] State of Michigan Electric Statistical Data Year end 12/31/2016

A. After reviewing the AEG statewide potential study, Staff believes there is potential available for the Company to not only improve their existing DR programs, but also introduce new DR programs in the near future.

Q. Does the statewide potential study show more programing than what the Company is already investing in?

A. Yes. Some examples of additional DR programing include, but are not limited to: voltage optimization, ancillary services, capacity bidding, and demand buyback. A full list is shown on, Page 29, Table 4-1 of the AEG statewide potential study.

Q. Does Staff have any final thoughts regarding the Company DR proposal in their integrated resource plan filed with this case?

A. Yes. The Company can improve and expand their existing DR programs in a cost-effective manner. Further, Staff believes the Company did not fully assess for modelling purposes of this certificate of need filing that DR in conjunction with Energy Waste Reduction and Renewable Energy could provide a cost-effective solution to reducing the size of a gas plant needed to fill capacity shortfalls, and could delay a construction start date, all while enhancing distribution reliability and stability in their service territory and should be considered in the Company's IRP as a packaged resource which competes with other generation resources.

Q. Does this conclude your testimony?

A. Yes

S T A T E OF M I C H I G A N

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

* * * *

In the matter of the Application of **DTE ELECTRIC COMPANY** for approval of Certificates of Necessity pursuant to MCL 460/6s, as amended, in connection with the addition of a natural gas combined cycle generating facility to its generation fleet and for related accounting and ratemaking authorizations.	)	Case No. U-18419

EXHIBITS OF

KATIE J. SMITH

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

MPSC Case No.: U-18419
Respondent: D.D. Kirchner
Requestor: STAFF
Question No.: STDE-1.14b
Page: 1 of 1

Question: Please reference Workpaper KJC-2.

b. What is the Company doing to increase participation?

Answer: The Company is only seeking to repair the switches for customer meters already enrolled in the IAC program and is not currently seeking to increase participation in the IAC program. Instead, the Company is focusing its new enrollment efforts on Dynamic Peak Pricing. DPP can achieve similar kW reductions per customer with a Programmable Communicating Thermostat and DPP which does not require the customer to make an additional investment in a separate IAC meter, which is a requirement of the IAC program.

MPSC Case No.: U-18419
Respondent: D. D. Kirchner
Requestor: STAFF
Question No.: STDE-1.2c
Page: 1 of 1

Question: Please reference Workpaper KJC-2.

c. Please explain why there is no increase in participation and associated MW for any programs after 2019.

Answer: The Company has not proposed any expansion of Interruptible Tariff programs in the current Main Electric Rate Case – U-18255. Existing programs, such as Rider 10, are at their current capacity limits. In the programs where capacity is available on the tariff, such as D8, the Company has communicated with target customers about the availability and benefits of these programs but has not been successful in increasing enrollment in these interruptible rates as referenced in direct testimony of Company's Witness Ms. Dimitry in MPSC Case No. U-18255, IMD-24 lines 13-24 and Exhibit A-24, Schedule P1.

The Company is not currently forecasting growth in capacity through these programs due to either inability given the tariff cap or the lack of customer interest in the available Interruptible Rates. The Company will re-evaluate market interest as it prepares its next integrated resource plan, as required under Section 6t of PA341.

MPSC Case No.: U-18419
Respondent: D. D. Kirchner
Requestor: STAFF
Question No.: STDE-3.1e
Page: 1 of 1

Question: In reference to the Company's response to STDE-1.2a, please respond to the following:

e) Please indicate if the cap was Company requested.

Answer: The caps on the tariffs were requested by the Company.

S T A T E OF M I C H I G A N

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

*** * * ***

In the matter of the application of DTE ELECTRIC COMPANY for approval of Certificates of Necessity pursuant to MCL 460.6s, as amended, in connection with the addition of a natural gas combined cycle generating facility to its generation fleet and for related accounting and ratemaking authorizations	**)**	**Case No. U-18419**

QUALIFICATIONS AND DIRECT TESTIMONY OF

JESSE J. HARLOW

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

DIRECT TESTIMONY OF JESSE J. HARLOW
CASE NUMBER U-18419
PART III

Q. Please state your full name, business address and occupation.

A. My name is Jesse J. Harlow and my business address is 7109 West Saginaw, Lansing, Michigan 48917. I am employed as a public utilities engineer in the Renewable Energy Section of the Electric Reliability Division at the Michigan Public Service Commission (MPSC or Commission).

Q. Please describe your educational background.

A. In 2005, I earned a Bachelor of Science in Engineering from Michigan State University. Prior to my course work at Michigan State University, I was in an engineering transfer program at Lansing Community College where I was a member of the Phi Theta Kappa honor society.

Q. What is your professional work experience?

A. I have worked for the Commission since 2006. From 2006 until 2008, I worked in the Energy Grants Section of the Motor Carrier, Energy Grants and Information Division. My primary responsibility was for award selection and administration of Michigan Energy Efficiency (MIEE) grants. MIEE grants made up approximately 25% of the total allocations from the more than $80 million per year Low-Income and Energy Efficiency Fund.

In the later part of 2008, I was transferred into the Renewable Energy Section and became involved in the implementation of 2008 PA 295 (Act), focusing on electric provider's Renewable Energy Plan filings.

Q. Have you had any other training that is relevant to your testimony?

A. Yes, In 2008 I attended the Institute of Public Utilities Regulatory Studies Program, a two-week program with course work designed to educate regulatory professionals. In 2009, I attended the Institute of Public Utilities Advanced Regulatory Studies Program. In 2011, I attended courses in both the Institute of Public Utilities Regulatory Studies Program and the Institute of Public Utilities Advanced Regulatory Studies Program. Since then, I have continued to attend various courses in both the Institute of Public Utilities Regulatory Studies Program and the Institute of Public Utilities Advanced Regulatory Studies Program. To stay abreast with the rapidly growing and evolving field of renewable energy, I have attended and continue to attend various renewable energy related seminars and conferences. I have also presented at a number of events on renewable energy and 2008 PA 295 related issues. In November of 2016, I received training from the Mid-Continent Independent System Operator (MISO) on the EGEAS Capacity Expansion Modeling Software. Additionally, in May of 2017 EPIS provided Staff with a two week trial of and guidance on Aurora Modeling Software.

Q. Have you filed testimony or rebuttal testimony in any other cases?

A. I have filed testimony and/or rebuttal testimony in the following cases:

- U-16300 Consumers Energy Company's 2009 Renewable Energy Reconciliation on transfer price;
- U-16356 Detroit Edison Company's 2009 Renewable Energy Reconciliation on transfer price;

- U-16543 Consumers Energy Company's Amended Renewable Energy Plan on the Company's transfer price and solar program;
- U-16580 Alpena Power Company's Biennial Renewable Energy Plan;
- U-16582 Detroit Edison Company's Amended and Biennial Renewable Energy Plan on the Company's transfer price and solar program;
- U-16588 Wisconsin Electric Power Company's Biennial Renewable Energy Plan on transfer price;
- U-16367 Wisconsin Electric Power Company's 2010 Renewable Energy Reconciliation on transfer price;
- U-16301 Consumers Energy Company's 2010 Renewable Energy Reconciliation on the Company's Pre-Act expenditures and transfer price;
- U-16045-R Consumers Energy Company's 2010 PSCR on transfer price;
- U-16581 Consumers Energy Company's Biennial Renewable Energy Plan;
- U-16432-R Consumers Energy Company's 2011 PSCR on transfer price;
- U-16662 Wisconsin Electric Power Company's 2011 Renewable Energy Cost Reconciliation on transfer price;
- U-16655 Consumers Energy Company's 2011 Renewable Energy Cost Reconciliation on transfer price;
- U-16656 Detroit Edison Company's 2011 Renewable Energy Cost Reconciliation on transfer price;
- U-17302 DTE Electric Company's Biennial Renewable Energy Plan;

- U-17301 Consumers Energy Company's Biennial Renewable Energy Plan on transfer price and solar program additions;
- U-17321 Consumers Energy Company's 2012 Renewable Energy Cost Reconciliation on transfer price;
- U-17322 Detroit Edison Company's 2012 Renewable Energy Cost Reconciliation on transfer price;
- U-17631 Consumers Energy Company's 2013 Renewable Energy Cost Reconciliation on transfer price;
- U-17633 Indiana Michigan Power Company's 2013 Renewable Energy Cost Reconciliation on transfer price;
- U-17632 DTE Electric Company's 2013 Renewable Energy Cost Reconciliation on transfer price;
- U-17752 Consumer Energy Company's Amended Renewable Energy Plan regarding its Solar Gardens program;
- U-17792 Consumers Energy Company's 2015 Renewable Energy Plan with respect to the Company's treatment of transfer price as is applies to Company-owned facilities;
- U-17804 DTE Electric Company's 2014 Renewable Energy Cost Reconciliation on transfer price;
- U-17805 Indiana Michigan Power Company's 2014 Renewable Energy Cost Reconciliation on transfer price;

- U-17809 Wisconsin Electric Power Company's 2014 Renewable Energy Cost Reconciliation on transfer price;
- U-18081 Consumers Energy Company's 2015 Renewable Energy Cost Reconciliation on transfer price;
- U-18090 Consumers Energy Company's Avoided Cost Case;
- U-18091 DTE Electric Company's Avoided Cost Case;
- U-18092 Indiana Michigan Power Company's Avoided Cost Case;
- U-18093 Northern States Power Company's Avoided Cost Case;
- U-18094 Upper Peninsula Power Company's Avoided Cost Case;
- U-18392 Consumers Energy Company's T.E.S. Filer City Power Station Power Purchase Agreement Approval Request;
- U-18242 DTE Electric Company's 2016 Renewable Energy Cost Reconciliation on transfer price;
- U-18243 Indiana Michigan Power Company's 2016 Renewable Energy Cost Reconciliation on transfer price.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present and discuss non-centralized generation modeling scenarios and information which Staff maintains was lacking in DTE Electric Company's (Company) application. Had the Company analyzed these scenarios, it would have demonstrated that the Company undertook rigorous due diligence and strengthened its justification for requesting Certificate of Necessities (CON) for the addition of an approximately 1,100 megawatt 2x1 natural gas combined cycle (NGCC) generating facility in 2022.

Q. Are you sponsoring any exhibits?

A. Yes, I am sponsoring one exhibit:

Exhibit S-5.1, Discovery Response STED-17.1, dated: December 12, 2017

Q. Can you please describe the modeling scenarios that the Company failed to analyze?

A. The scenario referenced above is one that combines high renewable energy (at least 20%), high energy waste reduction (2% by 2021, and maintaining the same amount every year thereafter) and a high demand response program (5.8% of peak demand by 2023).

Q. Did the Company consider this scenario in its model runs?

A. No, as described in the Discovery Response attached as Staff witness Naomi Simpson's Exhibit S-2.10, the Company did not run all the components mentioned above in a single model run.

Q. Is there justification for the non-centralized modeling scenario percentages of renewable energy (RE), energy waste reduction (EWR) and demand response (DR) referenced above?

A. Yes. The Company met with Staff to discuss plans to reach 20% RE within the Company's renewable energy planning period. Additionally, potential studies have been completed for both EWR[1] and DR[2] showing that the above percentages are reasonable.

Q. What would be the significance of running a scenario that combines high RE, high EWR, and high DR?

A. Staff believes that a single scenario that combines high levels of these three resources could lead to a reduction in the need for a some of the 1,100-megawatt NGCC or all of a future asset or the potential to delay the need for this asset at an economically competitive level to the Company's current findings. Staff witness Naomi Simpson addresses this on page 25, lines 1-11 of her Direct Testimony.

Q. As discussed in your "testimony purpose" response above, what is the information, separate from the modeling scenarios, that you believe the Company's application is lacking?

A. As shown in my Exhibit S-5.1, the Company currently has over 550 megawatts of category 3 and above interconnection applications in some stage of completion since the beginning of 2017. This "queue" backlog is most likely the result of the

[1] http://www.michigan.gov/documents/mpsc/MI_Lower_Peninsula_EE_Potential_Study_Final_Report_08.11.17_598053_7.pdf

[2] http://www.michigan.gov/documents/mpsc/State_of_Michigan_-_Demand_Response_Potential_Report_-_Final_29sep2017__602435_7.pdf

pending avoided cost Case No. U-18091 and came about after the Company began analyzing its capacity needs going forward, but could play a significant role in the Company's modeling should it update its current model inputs and assumptions.

Q. Does this complete your testimony?

A. Yes, it does.

S T A T E OF M I C H I G A N

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

*** * * ***

In the matter of the application of DTE ELECTRIC COMPANY for approval of Certificates of Necessity pursuant to MCL 460.6s, as amended, in connection with the addition of a natural gas combined cycle generating facility to its generation fleet and for related accounting and ratemaking authorizations	**)**	**Case No. U-18419**

EXHIBIT OF

JESSE J. HARLOW

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

MPSC Case No.: U-18419
Respondent: R. J. Mueller
Requestor: Staff
Question No.: STDE-17.1
Page: 1 of 5

Question: With respect to interconnection applications for Category 3, 4 or 5 projects the Company has received during 2017, please provide a list showing the following information for each application:

Date Application Received
Capacity, MW
Technology Type (solar, wind, etc…)
Has the engineering review started? (Yes or No)
Has the engineering review completed? (Yes or No)

Answer:

Project Number	Date Application Received	Capacity kW	Capacity kVA	Generation Type	Has Engineering Review Started	Has Engineering Review Completed
DE17009	1/13/2017	3000	3300	Dynometer	Yes	Yes
DE-02161	2/24/2017	5000	5000	Solar PV	No	
DE-02162	2/24/2017	5000	5000	Solar PV	No	
DE-02163	2/24/2017	5000	5000	Solar PV	No	
DE-02164	2/24/2017	5000	5000	Solar PV	Yes	No
DE-02165	2/24/2017	5000	5000	Solar PV	No	
DE17120	6/6/2017	20000	22500	Solar PV	No	
DE17121	6/6/2017	20000	22500	Solar PV	No	
DE17118	6/14/2017	8750	8750	Synchronous Gas	Yes	No
DE17179	8/2/2017	2000	2200	Solar PV	No	
DE17180	8/2/2017	2000	2200	Solar PV	No	
DE17181	8/2/2017	2000	2200	Solar PV	No	
DE17182	8/2/2017	2000	2200	Solar PV	No	
DE17187	8/4/2017	2000	2200	Solar PV	No	
DE-02384	8/16/2017	7700	7700	Gas Turbine	No	
DE-02390	8/17/2017	2000	2689.689	Solar PV	No	
DE-02391	8/17/2017	2000	2689.689	Solar PV	Yes	No
DE-02392	8/17/2017	2000	2689.689	Solar PV	No	
DE-02393	8/17/2017	2000	2689.689	Solar PV	No	
DE-02394	8/17/2017	2000	2689.689	Solar PV	Yes	No
DE-02395	8/17/2017	2000	2689.689	Solar PV	No	
DE-02396	8/17/2017	2000	2689.689	Solar PV	No	

MPSC Case No.: U-18419
Respondent: R. J. Mueller
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Project Number	Date Application Received	Capacity kW	Capacity kVA	Generation Type	Has Engineering Review Started	Has Engineering Review Completed
DE-02397	8/17/2017	2000	2689.689	Solar PV	No	
DE-02398	8/17/2017	2000	2689.689	Solar PV	No	
DE-02399	8/17/2017	2000	2689.689	Solar PV	No	
DE-02400	8/17/2017	2000	2689.689	Solar PV	No	
DE-02401	8/17/2017	2000	2689.689	Solar PV	No	
DE-02402	8/17/2017	2000	2689.689	Solar PV	No	
DE-02403	8/17/2017	2000	2689.689	Solar PV	No	
DE-02404	8/17/2017	2000	2689.689	Solar PV	No	
DE-02405	8/17/2017	2000	2689.689	Solar PV	No	
DE-02406	8/17/2017	2000	2689.689	Solar PV	No	
DE-02425	8/23/2017	2000	2689.689	Solar PV	No	
DE-02426	8/23/2017	2000	2689.689	Solar PV	No	
DE-02427	8/23/2017	2000	2689.689	Solar PV	No	
DE-02428	8/23/2017	2000	2689.689	Solar PV	No	
DE-02429	8/23/2017	2000	2689.689	Solar PV	No	
DE-02430	8/23/2017	2000	2689.689	Solar PV	No	
DE-02431	8/23/2017	2000	2689.689	Solar PV	No	
DE-02432	8/23/2017	2000	2689.689	Solar PV	No	
DE-02433	8/23/2017	2000	2689.689	Solar PV	Yes	No
DE-02434	8/23/2017	2000	2689.689	Solar PV	No	
DE-02435	8/23/2017	2000	2689.689	Solar PV	No	
DE-02436	8/23/2017	2000	2689.689	Solar PV	No	
DE-02437	8/23/2017	2000	2689.689	Solar PV	No	
DE-02438	8/23/2017	2000	2689.689	Solar PV	No	
DE-02439	8/23/2017	2000	2689.689	Solar PV	Yes	No
DE-02447	8/28/2017	2000	2689.689	Solar PV	No	
DE-02448	8/28/2017	2000	2689.689	Solar PV	No	
DE-02449	8/28/2017	2000	2689.689	Solar PV	No	
DE-02450	8/28/2017	2000	2689.689	Solar PV	No	

MPSC Case No.: U-18419
Respondent: R. J. Mueller
Requestor: Staff
Question No.: STDE-17.1
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Project Number	Date Application Received	Capacity kW	Capacity kVA	Generation Type	Has Engineering Review Started	Has Engineering Review Completed
DE-02452	8/28/2017	2000	2689.689	Solar PV	No	
DE-02453	8/28/2017	2000	2689.689	Solar PV	No	
DE-02454	8/28/2017	2000	2689.689	Solar PV	No	
DE-02455	8/28/2017	2000	2689.689	Solar PV	No	
DE-02456	8/28/2017	2000	2689.689	Solar PV	No	
DE-02457	8/28/2017	2000	2689.689	Solar PV	No	
DE-02458	8/28/2017	2000	2689.689	Solar PV	No	
DE-02459	8/28/2017	2000	2689.689	Solar PV	No	
DE-02460	8/28/2017	2000	2689.689	Solar PV	Yes	No
DE-02461	8/28/2017	2000	2689.689	Solar PV	No	
DE-02462	8/28/2017	2000	2689.689	Solar PV	No	
DE-02463	8/28/2017	2000	2689.689	Solar PV	No	
DE-02464	8/28/2017	2000	2689.689	Solar PV	No	
DE-02465	8/28/2017	2000	2689.689	Solar PV	No	
DE-02466	8/28/2017	2000	2689.689	Solar PV	No	
DE-02467	8/28/2017	2000	2689.689	Solar PV	No	
DE-02468	8/28/2017	2000	2689.689	Solar PV	No	
DE-02469	8/28/2017	2000	2689.689	Solar PV	No	
DE-02470	8/28/2017	2000	2689.689	Solar PV	No	
DE-02471	8/28/2017	2000	2689.689	Solar PV	No	
DE-02472	8/28/2017	2000	2689.689	Solar PV	No	
DE-02473	8/28/2017	2000	2689.689	Solar PV	No	
DE-02474	8/28/2017	2000	2689.689	Solar PV	No	
DE-02475	8/28/2017	2000	2689.689	Solar PV	Yes	No
DE-02501	9/6/2017	2000	2689.689	Solar PV	No	
DE-02502	9/6/2017	2000	2689.689	Solar PV	No	
DE-02503	9/6/2017	2000	2689.689	Solar PV	No	
DE-02504	9/6/2017	2000	2689.689	Solar PV	No	
DE-02505	9/6/2017	2000	2689.689	Solar PV	No	

MPSC Case No.: U-18419
Respondent: R. J. Mueller
Requestor: Staff
Question No.: STDE-17.1
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Project Number	Date Application Received	Capacity kW	Capacity kVA	Generation Type	Has Engineering Review Started	Has Engineering Review Completed
DE-02506	9/6/2017	2000	2689.689	Solar PV	Yes	No
DE-02507	9/6/2017	2000	2689.689	Solar PV	Yes	No
DE-02508	9/6/2017	2000	2689.689	Solar PV	No	
DE-02509	9/6/2017	2000	2689.689	Solar PV	No	
DE17183	9/8/2017	2000	2380	Solar PV	No	
DE17184	9/8/2017	2000	2380	Solar PV	No	
DE17185	9/8/2017	2000	2380	Solar PV	No	
DE-02529	9/14/2017	2000	2689.689	Solar PV	No	
DE-02530	9/14/2017	2000	2689.689	Solar PV	No	
DE-02531	9/14/2017	2000	2689.689	Solar PV	No	
DE-02532	9/14/2017	2000	2689.689	Solar PV	No	
DE-02533	9/14/2017	2000	2689.689	Solar PV	Yes	No
DE-02534	9/14/2017	2000	2689.689	Solar PV	No	
DE-02567	9/30/2017	2000	2689.689	Solar PV	No	
DE-02569	10/2/2017	360	360	Dynometer	No	
DE-02570	10/3/2017	20000	23538.284	Solar PV	No	
DE-02571	10/3/2017	20000	23538.284	Solar PV	No	
DE-02572	10/3/2017	20000	23538.284	Solar PV	No	
DE17188	10/6/2017	20000	21000	Solar PV	No	
DE-02582	10/10/2017	4600	4600	Steam Turbine	No	
DE-02587	10/11/2017	2000	2689.689	Solar PV	No	
DE-02588	10/11/2017	2000	2689.689	Solar PV	No	
DE-02590	10/11/2017	2000	2689.689	Solar PV	No	
DE-02591	10/11/2017	2000	2689.689	Solar PV	No	
DE17186	10/12/2017	50000	50000	Solar PV	Yes	No
DE17191	11/3/2017	3464	3464	Steam Turbine	No	
DE-02684	11/12/2017	2000	2689.689	Solar PV	No	
DE-02685	11/12/2017	20000	25124.098	Solar PV	No	
DE-02686	11/12/2017	20000	25124.098	Solar PV	No	

MPSC Case No.: U-18419
Respondent: R. J. Mueller
Requestor: Staff
Question No.: STDE-17.1
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Project Number	Date Application Received	Capacity kW	Capacity kVA	Generation Type	Has Engineering Review Started	Has Engineering Review Completed
DE-02687	11/12/2017	20000	25124.098	Solar PV	No	
DE-02688	11/12/2017	20000	25124.098	Solar PV	No	
DE-02689	11/12/2017	20000	25124.098	Solar PV	No	
DE-02690	11/12/2017	20000	25124.098	Solar PV	No	
DE-02703	11/17/2017	17640	22000	Solar PV	No	
DE-02704	11/17/2017	19933.2	22000	Solar PV	No	
DE-02706	11/17/2017	19933.2	22000	Solar PV	No	
DE-02750	11/30/2017	2000	2689.689	Solar PV	No	
DE-02751	11/30/2017	2000	2689.689	Solar PV	No	
DE-02752	11/30/2017	2000	2689.689	Solar PV	No	
DE-02753	11/30/2017	2000	2689.689	Solar PV	No	
DE-02754	11/30/2017	2000	2689.689	Solar PV	No	
DE-02755	11/30/2017	2000	2689.689	Solar PV	No	

S T A T E OF M I C H I G A N

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

*** * * ***

In the matter of the application of	**)**	
DTE ELECTRIC COMPANY	**)**	
approval of Certificates on Necessity	**)**	**Case No. U-18419**
pursuant to MCL 460.6s, as amended,	**)**	
in connection with the addition of a	**)**	
natural gas combined cycle generating	**)**	
facility to its generation fleet and for	**)**	
related accounting and ratemaking	**)**	
authorizations.	**)**	
	)	

QUALIFICATIONS AND DIRECT TESTIMONY OF

ROBERT F. NICHOLS II C.P.A.

MICHIGAN PUBLIC SERVICE COMMISSION

January 12, 2018

QUALIFICATIONS OF ROBERT F. NICHOLS II C.P.A.
CASE NUMBER U-18419
PART I

Q. Please state your name and business address.

A. My name is Robert F. Nichols II, and my business address is 7109 West Saginaw Highway, Lansing, MI 48917.

Q. By whom are you employed and in what capacity?

A. I am employed by the Michigan Public Service Commission (Commission or MPSC) as the Manager of the Revenue Requirements Section of the Financial Analysis and Audit Division.

Q. How long have you been employed by the MPSC and what are your duties?

A. I have been employed by the MPSC since November of 2011. As Manager of the Revenue Requirements section, I am primarily responsible for the planning and direction of electric and gas rate case audits and presentations, as well as cases involving accounting standards and requests for accounting authority. From 2011 through March 2016, as an Auditor within the Revenue Requirements section, my responsibilities included auditing, analyzing, and making recommendations regarding utility revenues, expenses, and rate base.

Q. Please describe your educational background.

A. I graduated from Davenport University, with highest honors, in 2009 with a Bachelor of Business Administration degree in Accounting Information Management. I attended a regulation and ratemaking conference hosted by the Michigan State University Institute of Public Utilities (MSU IPU) in May of 2012. In August of 2012, I attended the National Association of Regulatory Utility Commissioners (NARUC) annual two week Regulatory Studies Program held at Michigan State University. In August 2013, August 2014, August 2015,

and August 2016, I attended the Annual Regulatory Studies Program hosted by MSU IPU. I also attended a one week Advanced Regulatory Studies Program in September of 2013, in September of 2014, and October of 2016, hosted by MSU IPU.

Q. Please describe your professional background.

A. Prior to coming to the MPSC, from 2000 to 2011, I was employed by Genesee Cut Stone & Marble Company. My duties there included sales, drafting, and estimating.

Q. Do you have any professional licenses?

A. Yes. I am a Certified Public Accountant, licensed by the State of Michigan.

Q. Have you prepared testimony or assisted in any other proceedings?

A. I have assisted or filed testimony in the following cases:

Case No.	Company	Subject/Type
U-16855	Consumers Energy Co. Gas	Rate Case
U-16969	SEMCO Energy Gas Company	Merger and Acquisition
U-16794	Consumers Energy Co. Electric	Rate Case
U-16999	Michigan Consolidated Gas Co.	Rate Case
U-16855	Consumers Energy Co. Gas	Self-Implementation Refund
U-17087	Consumers Energy Co. Electric	Rate Case
U-17197	Consumers Energy Co. Gas	Rate Case
U-17273	Michigan Gas Utilities Corp.	Rate Case
U-17274	Upper Peninsula Power Co.	Rate Case
U-17440	Consumers Energy Co. Electric	Self-Implementation Refund

QUALIFICATIONS OF ROBERT F. NICHOLS II C.P.A.
CASE NUMBER U-18419
PART I

1	U-17488	Northern States Power Co. Gas	Rate Case
2	U-16999	DTE Gas IRM	Reconciliation
3	U-17620	Consumers Energy Co.	OPEB Trust Funding
4	U-17643	Consumers Energy Co. Gas	Rate Case
5	U-17669	WPSC Electric	Rate Case
6	U-17735	Consumers Energy Co. Electric	Rate Case
7	U-17882	Consumers Energy Co. Gas	Rate Case
8	U-17999	DTE Gas Company	Rate Case
9	U-18014	DTE Electric Company	Rate Case
10	U-17990	Consumers Energy Co. Electric	Rate Case
11	U-18124	Consumers Energy Co. Gas	Rate Case
12	U-18322	Consumers Energy Co. Electric	Rate Case
13	U-18255	DTE Electric Company	Rate Case
14	U-18370	I&M Power Company	Rate Case

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present the MPSC Staff's (Staff) position on DTE Electric Company's (Company) accounting request related to current recovery of financing costs on the proposed project.

Q. Are you sponsoring any exhibits?

A. No.

Q. Has the Company requested current recovery of financing costs related to the proposed project?

A. Yes.

Q. Does Staff support current recovery of financing costs related to the proposed project?

A. Yes, Staff only supports current recovery of financing costs related to the proposed project as long as the project costs are requested in a general rate case as part of base rates and the costs are found to be reasonable and prudent.

Q. Has the Company requested current recovery of financing costs related to the proposed project in a general rate case?

A. Yes, the Company has requested current recovery of financing costs related to the proposed project in its general rate case U-18255.

Q. What is Staff's position on current recovery of financing costs related to the proposed project in base rates in its general rate case U-18255?

A. Although I did not oppose the accounting request for current recovery of financing costs on the proposed project in U-18255, Staff witness Simpson found

it would not be reasonable and prudent to include the project costs in U-18255 base rates.

Q. Does Staff support the Company's use of traditional accounting and ratemaking treatment of financing costs incurred during the CON construction period should the Commission not approve the requested accounting and ratemaking treatment of financing costs?

A. Yes. If the Commission does not approve the accounting request for current recovery of financing costs on the proposed project, Staff supports traditional accounting and ratemaking treatment of financing costs incurred during the CON construction period.

Q. Does this conclude your testimony?

A. Yes.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of
DTE ELECTRIC COMPANY for approval of
Certificates of Necessity pursuant to
MCL 460.6s, as amended, in connection
with the addition of a natural gas combined
cycle generating facility to its generation
fleet and for related accounting and
ratemaking authorizations.
_____/

Case No. **U-18419**
(e-file paperless)

PROOF OF SERVICE

STATE OF MICHIGAN)
) ss
COUNTY OF EATON)

Teresa Lippert, being first duly sworn, deposes and says that on **January11, 2018,** she served a true copy of the **Michigan Public Service Commission Staff's Twelfth Discovery Request to DTE Electric Company** upon the following parties **via e-mail only:**

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Teresa Lippert

Teresa M. Lippert

Subscribed and sworn to before me
this **11th** day of **January, 2018.**

Lisa Felice

Lisa Felice
Notary Public, Eaton County, Michigan
My Commission Expires: April 15, 2020